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ADDRESSES AND ORIGINAL ARTICLES

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As a teacher I have always had great difficulty in making clear to the student what inflammation really is and where the process ends. Most writers on the subject seem to me to be in the same difficulty. Text-books on pathology, with the exception of Thoma, either imply or state definitely that Burdon Sanderson's definition of inflammation is a true one. Thoma, in one of the most learned and instructive books ever written on general pathology,[1] makes no great allusion to "inflammation," and the word does not appear even in the index. Burdon Sanderson laid down that "'inflammation' is the succession of changes occurring in a part as the result of injury, provided that that injury be not so excessive as to destroy the vitality of the part." This definition has no time limit, the nature of the injury is not specified, and it includes events the natures of which fundamentally vary from each other, events that were either well known or only conceived, at the time Burdon Sanderson's definition was made. As the definition stands, it would include to-day processes of infection, local and general immunity, phagocytosis, and the repair of damaged tissue. Even the incidence of certain benign neoplasms, of sarcoma and carcinoma, could reasonably be included in this definition, and often are by some authors.

Burdon Sanderson's definition is so comprehensive that there appears no limit to its application, provided a part has been injured; and the common saying that "inflammation is the basis of all pathology" would be almost correct if its terms be accepted. This application is really as meaningless and as cryptic as if it were said that biochemical, nutritional or varying radiation changes, and even heredity, were the foundations of all pathological changes. Twenty years before Burdon Sanderson made his historical definition, Lister published his classical investigation upon the Early Stages of Inflammation, which appeared in the *Philosophical Transactions* of the Royal Society in 1858. As the result of this investigation, Lister conceived that inflammation is a pathological process, and he ended his researches in these words: "That whenever inflammation, congestion, or, in other words, that disturbance of the circulation which is truly characteristic of inflammation, exists in any degree, the tissues of the affected part have experienced to a proportionate extent a temporary impairment of functional activity or vital change."

Before Lister, John Hunter had conceived an opposite view, and believed that inflammation was active in its nature, and consisted in an exaltation of the affected parts, and that any increase of blood-supply that might accrue to an inflamed part would necessarily induce an increased growth, or action, of that part and, as a result, induce the repair of damaged tissue.

Hunter on Increased Blood-supply

Let me take these notions more in detail. With the intention of demonstrating the power of action by increasing the blood-supply to a part, John Hunter transplanted cocks' spurs into their combs. By so doing he assumed he was transplanting spurs to a more vascular part than that which they normally occupy. The result was, as Hunter conjectured, the spurs grew to enormous sizes, a condition he put down to the "greater power of action in the comb than in the leg." As a contributory cause of the excessive growth, he said there was no stagnation of the blood in the veins of the head.

Hunter also considered that the new blood-vessels that are formed in newly extravasated and uniting substance in the healing of wounds stimulated healing by giving "power of action."

Turning to Hunter's transplantation experiment, some years ago I repeated it, and, besides transplanting the spurs into the cocks' combs, I transplanted spurs into the almost avascular subcutaneous tissue of their necks. In carrying out these operations I was by no means convinced that the cocks' combs were very vascular parts, unless they became erect. A comb is chiefly composed of exceedingly avascular gelatinous tissue. However, my results were that all the spurs, whether transplanted into the comb or into the neck, grew to about the same extent during the same time, and all the growing spurs were provided with a special supply of blood-vessels for their nourishment. The explanation of the excessive growth in the spur when transplanted in the comb cannot have been due to the greater vascularity of the comb, nor to the freedom of the venous return, even if it be granted that Hunter's notion is right—viz., that a spur when transplanted into a comb is transplanted into a highly vascular part, and therefore receives a greater blood-supply. The same amount of growth took place during the same time in the subcutaneous tissue of the birds' necks. The latter plane is almost avascular. Nor could the excessive growth in the combs be due to their "greater power of action" than in the leg, unless the subcutaneous tissue of the neck also possesses a greater power of action than the leg. The greater increase of size that occurred in the spurs when transplanted into the comb, and also into the subcutaneous tissue of the neck, is capable of another explanation. In these two new situations—the comb and the subcutaneous tissue in the back of the bird's neck—the spurs were not exposed to the wear and tear of life they encountered in their normal positions. When a cock's spur is protected from this wear and tear of life by means of a thimble, it grows to an enormous length, and forms a most dangerous weapon for cock-fighting purposes.

It is difficult to see exactly what Hunter's experiment does prove. Biological laws of function, physiology, heredity, and so forth, are so interfered with by altering the normal position of a spur that the results of the experiment become too complicated to render an explanation possible without further evidence, which at present is unattainable. For example, if Hunter were right in his conception that the spur grew to so large a size because the comb possessed greater power of action than the leg, and because the venous return were more perfect, the following question would naturally arise and demand an answer: How is it that a normal comb ceases to grow when it is in possession of so much "power of action" as to enable it to induce such enormous growth in another structure?

The reason of the increase of growth in the spurs when transplanted to these new situations is probably

* An address delivered before the Clinical Congress of the American College of Surgeons at St. Louis in October, 1932.

[1] Text-book of General Pathology and Pathological Anatomy. Vol. I. By Richard Thoma. Translated by Alexander Bruce. London. 1896.

more complicated than the one I just now adduced, although it may have an important bearing on the matter.

I do not believe that the results of Hunter's experiment can be explained by the spur being transplanted into a part where the blood-supply was greater than in its normal position. The comb at rest, and not in a state of erection, is almost an avascular structure that does not even bleed on incision. Besides, the neck control experiment negatives that explanation. Nor do I believe that there is any evidence in support of the more general theory that an increase of blood-supply will alone induce an increase in growth or an incitement to grow. The incidence and maintenance of normal growth, of repair, and of neoplasms depend on many more factors than merely the increase or diminution of blood-supply. An increase of blood-supply will not induce an increase of growth, but will render it possible by supplying the extra nourishment which a growing tissue demands.

Lister on Impaired Function

Turning again to the observations of Lister on "the early stages of inflammation," in this paper Lister chiefly limits his observations to showing that an injured blood-vessel is dilated to the state of temporary paralysis, that stasis occurs, that red and white blood corpuscles tend to adhere to each other and to the injured parts of the blood-vessels' walls, and that the blood corpuscles behave normally directly they have passed through the damaged area of the blood-vessel walls. Further, Lister drew particular attention to the arrest of ciliary movements in ciliated epithelium and the cessation of movements of the pigment granules in pigment cells, both of which he maintained were evidences of impaired functions in the inflamed parts. So far as I am concerned, and with two additional factors, Lister's conception appears to me to be the essence of inflammation. The additional factors to which I have just alluded are the exudation of plasma and a limited emigration of red and white blood corpuscles from the injured blood-vessel walls. I cannot understand why Lister did not include these two factors in his description. Waller,[2] in 1846, had described them, but no notice was taken of Waller's work until Cohnheim called renewed attention to it in 1867, 1869, and 1873. Exudation of plasma and emigration of red and white corpuscles occur pari passu with the other changes that Lister described, and therefore necessarily should be included in early changes. In fact, stasis of the corpuscles in an inflamed area is due to the escape of plasma from the injured blood-vessel walls, and emigration of red and white blood corpuscles has occurred before stasis takes place.

Need for Stricter Definition

I had not the privilege of knowing Lister until over 30 years after his work on inflammation. By this time his life was fully occupied in teaching the world the results of his epoch-making and more recent discoveries; and having settled the matter that inflammation is a pathological process, he was disinclined to open the matter again, and was unable to inform me of the nature of the events he would have included in an investigation into the late stages of inflammation. Lister's conception of inflammation, with the addition of the immediate exudation of plasma and a limited emigration of red and white corpuscles, is, from my point, the state of inflammation, and there, upon resolution, the process stops. Inflammation, therefore, forms only one of the effects that may occur after injury to a part. The nature, degree, and duration of the injury seem to me to induce distinct and separate events governed by entirely different factors which should not be included in inflammation. These eventful changes in the parts injured are entirely different from each other and affected and controlled by different problems, while the process of inflammation, as I have conceived it, remains the same.

Still, I cannot imagine a more dramatic or descriptive term than that of "inflammation" that was applied by prehistoric observers to a hot, swollen, red, and painful part. Much water has passed under the bridges since the early ages prior to and including the first half of the nineteenth century. Infection and its consequences, immunity and infection, the growth and physiology of normal tissues and the effects upon them of endocrines, the repair of tissues and the formation of neoplasms, have become separate problems, and yet they are being described at present in the one inextricable tangle of "inflammation."

The knowledge of these fresh problems, incomplete though it be, is so vast and so rapidly accumulating that I feel this fact alone demands their exclusion from the subject of inflammation, and that a definite limit should be put to its action and influence.

I am fully aware that a great deal I have said is purely contentious and may be regarded as being entirely wrong. I admit that it represents only a personal opinion. Yet I believe I shall carry most pathologists with me when I say that the time has come to exclude repair of tissue after injury and the formation of neoplasms of all kinds from the subject of inflammation. It is gradually dawning on us that they are under such definite and complete control of the body in some instances, and under a disturbed control in others, that they should be extricated from the subject of inflammation and studied apart from its present domination. Take the formation of fibrous tissue after an injury for an example. Here the growth is definitely limited and controlled for a considerable time after all signs of inflammation have ceased. It is by no means certain whether the deposition of this particular fibrous tissue depends upon the alteration of lymphocytes into macrophages, which in turn become fibrous tissue cells, or whether it is chiefly due to the division and multiplication of the pre-existing local fibrous cells. From my observations I am convinced that pre-existing fibrous cells can and do divide to form new tissue. There also can be no doubt that macrophages can and do become connective tissue cells in many instances.

It sounds most unorthodox to say so at the present moment, but I believe the presence of a lymphocyte does not indicate the existence of an inflammatory lesion. Its presence depends upon a physiological response to an injury that may or may not have induced inflammation. Directly one cell begins to divide into two cells, or even upon a definitely controlled deposition of connective tissue cells derived from macrophages, a fresh element has been established; and although it would not have occurred had there been no injury, the division of cells is not necessarily the effect of inflammation.

Let me go more into detail by speaking of four subjects: the repair of tissues; the formation of fibro-adenomata of the breast; the formation of papillomata in the breast; and some local aspects of infection.

The Repair of Tissues

In the repair of tissues there is an example of organised and beautifully controlled growth. The

[2] London and Edinburgh Philosoph. Magaz., xxix., 397.

control is so definite that the growth cannot be explained as being due only to the presence of growth-stimulating agents induced by injury. If that were the only inducement or factor of this growth, tumour formations would be expected rather than definite organised repair of tissues. There is also something more at the back of it all than the presence of hormones. Even supposing it were a fact that these two agents directly accounted for the formation of new tissue, the nature and degree of the injury would be the essential provocative agent, and not inflammation. Why should epithelial cells which have covered a raw surface cease to multiply on the instant the raw surface has been covered? No more complete control of growth can be imagined than that which is occurring in the tissues of a healing ulcer of the skin. Until it is covered by epithelium, an enormous number of blood-vessels are provided for the nourishment of the granulation tissue, but directly the ulcer has been covered by epithelium these newly formed blood-vessels begin to disappear, and those that remain are only those that are sufficient in number to maintain the nourishment of the part. The coördination of the blood-supply to the demands of growth, and the subsequent maintenance of nourishment, is here perfectly timed and masterly in execution. The repair of tissue does not depend upon a haphazard supply of blood-vessels. Sufficient nourishment is supplied to meet the demand, and when that demand ceases the number of blood-vessels which were previously essential become unnecessary and spontaneously vanish. Even the formation of keloids are under some kind of control, which is probably local and systemic control. During the process of healing of a simple fracture the growth of fibrous tissue from the periosteum cannot be diagnosed from sarcoma by morphological examination, yet its limitation is under marked control, and subsequently the chief mass of it completely disappears.

By examining microscopically the fractured ribs of guinea-pigs from the moment of injury to 36 days, I have been able to watch all the stages of a healing fracture. Besides teaching me a great deal more than I knew before, the prolonged and orderly sequence of events convinced me that they could not have been due to inflammation induced by the injury, or to the excretions of stimulating substance of growth due to the injury or to the uncontrolled action of hormones. How can anyone maintain that so complicated and controlled an event as the ossification of the tissues that subsequently unite a fractured bone is an inflammatory process?

I arrived at the same conclusions upon examining microscopically the common carotid arteries of cats from the moment they were ligated until 14 days afterwards. Upon examination of the blood-clot within the lumen of the artery, the smallness in number of the emigrated polynucleated leucocytes is surprising in uninfected specimens. Chiefly lymphocytes invade the uninfected clot. The repair of the arterial coats that had been ruptured at the seat of ligation and the organisation of the blood-clot took place from the subendothelial connective tissue of the intima, and possibly by the change of the macrophages into fibrous tissue. The organisation of the clot does not depend upon a multiplication of the endothelial cells. The only multiplication they undergo takes place when they finally cover the newly formed connective tissue derived from the intima. Moreover, the lumen of the artery at the end of 14 days had diminished in size for a considerable distance of its length. This is caused by an increase of the connective tissue of the intima immediately beneath the endothelial lining which remained normal. In this part of the artery the increase of connective tissue must be chiefly derived from the pre-existing cells of the intima, because there is no invasion of lymphocytes from which the macrophages are derived, nor could I detect any evidence of a subsequent invasion of macrophages.

The formation of adhesions are good examples of purposeful growth of cells which appear to be carrying out inherited functions. In this connexion I once had the opportunity of examining microscopically an excised bursa patellæ that had suffered from injury unconnected by infective process. I excised the bursa ten days after the injury. The inflammation induced an exudation of plasma within the bursal sac and bursal wall. The plasma coagulated, and in the cavity of the bursa formed a meshwork of fibrin. Where the endothelial cells lining the bursa had been rubbed off, the branches of fibrin remained attached to the fibrin in this part of the bursal wall. These attached fibrinous branches became supports, like hop-poles, for the upgrowth of fibrous connective tissue cells, which took along with them blood-vessels for their nourishment. The formation of the adhesion was definitely finished by its being covered by a layer of endothelial cells continuous with those lining the bursal sac. The remains of the fibrin could still be seen in the centres of young adhesions.

Inflammation and Neoplasias of the Breast

The neoplasias of the breast, known as *fibro-adenomata*, may at first appear to be growths that exhibit no control in their formation. The contrary is the fact. They are under some control that cannot be explained merely by inflammation, to which their presence is so often attributed. There is no sign of inflammation.

First let me take the fibro-adenomata that appear at puberty. In their simplest states they are formed by precisely the same tissues that are undergoing physiological activity elsewhere in the same breast. New glandular elements of ducts and acini may be formed in these tumours, and whether newly formed or not, they are usually surrounded by dense layers of pericanalicular and periacinous connective tissues. It is this newly formed pericanalicular and periacinous connective tissue coming in contact with the supporting connective tissues of the breast that gives these tumours the macroscopical appearance of encapsulation. To classify all these perturbed physiological changes as being inflammatory does not seem to me to touch the problem of their existence.

Secondly, let me take the intracanalicular fibro-adenomata, the connective tissue parts of which I have described as arising from the subepithelial connective tissue. These tumours occur later in life than those of puberty, generally about the fourth or fifth decade. The glandular epithelium covering these tumours often dips down into the connective tissue element and forms perfectly developed normal-looking acini, which any young breast would be proud to possess. Irregularly planned new breast tissue has been developed in these tumours, the formation of which is under some control, even if it be an irregular control.

Next let me take the formation of *papillomata* in the ducts of the breast. From small beginnings of stalks formed by the ingrowth of pericanalicular tissue containing the elastica which are covered by epithelium, these stalks coalesce and in many instances papillomata develop into tumours consisting of

irregularly disposed ducts and acini. These tumours form another example of some disturbance of control and an aborted attempt to form new breast glandular tissue. Nothing can convince me that they are evidence of only inflammation nor that inflammation has anything to do with their formation. Their problem belongs to the problem of growth and tumour formation.

Local Aspects of Infection

Lastly, let me take evidence on these matters given by the morphological appearances in the subcutaneous tissues that have been inoculated with a culture of *Staphylococcus aureus*, sufficient in dosage and virulence to give rise to a localised abscess that ruptured in seven days. In this experiment I examined microscopically the whole of the affected area, varying from the effects of the immediate inoculation of *S. aureus* to ten days afterwards. The dosage, or virulence, was sufficient to give rise to localised suppuration. I have described these experiments in detail in Choyce's "System of Surgery," and they need not here be repeated. The impressions I gained from a morphological study of the events that ensued were as follows:—

The course and results of an infection depend primarily upon a balance or an adjustment between the resistance of the host and chiefly the virulence of the micro-organisms at the actual moment of infection. For example, take the rapid death of a host from the generalisation of an infection. Here either the resistance of the host is so low, or the degree of virulence of the micro-organism is so high, that no time is allowed for the formation of an acute local suppuration. Hence, when an acute abscess has time to form it can be accounted for only by a difference in the adjustment between the powers of resistance of the host and the degree of attack on the part of the micro-organism at the time the micro-organism entered. It may well be that already a degree of immunity must be needed to enable only an acute abscess to form and not a diffusing suppuration.

During the course of even the formation of an acute abscess the process of the host's resistance may become lowered and lead to a spread of disease, yet my opening statement remains a sound one.

The first thing that occurs in the formation of an acute abscess is the death of tissue with which the infecting agents come in contact. The next thing that is obvious is the tremendous emigration of polynuclear leucocytes, most of which are at first killed. However, the process of emigration of these leucocytes continues and subsequently most of them survive. The third and fourth events are the emigration of lymphocytes and the hyperplasia of the normal strands of fibrous connective tissues that support the subcutaneous fat. These events occur immediately around the developing abscess, and by the fourth day they are well established. I do not know whether the inducement of emigration of the leucocytes is the same in a suppurating process as it is in the early stage of an inflammation due to mechanical injury; most probably it is not the same. But if the inducing agents of leucocytic emigration be the same in both processes, then it could be claimed that inflammation is a great factor in suppuration.

If, however, the inducement of the leucocytes to emigrate in a suppurating process be not the same as in inflammation produced by mechanical injury, then not inflammation but some other process is in operation. I doubt very much whether the factors that induce the emigration of leucocytes are the same in infective and non-infective lesions. In infective processes the polynuclear leucocytes are concerned with the process of immunity; the necessity for which does not arise in a mechanical injury only.

The bone-marrow in which the enormous increase of polynuclear leucocytes are manufactured is not in a state of inflammation. In fact, the whole of this part in the formation of an acute abscess may be considered as being questions of immunity rather than being concerned with the process of inflammation. Micro-organisms at first multiply and are mixed with no arrangement in the lesion. By the seventh day a very definite arrangement has occurred in which a dense mass of micro-organisms completely encircles the inside of any abscess cavity in the form of a ring. The ring of micro-organisms is situated at the extreme edge of the pus in the abscess cavity beyond which none can be seen. It is impossible to explain the meaning of this ring, beyond suggesting it has something to do with the question of immunity.

Turning to the later events, let us consider the hyperplasia of the normal supporting strands of connective tissue during the process of formation of an acute abscess. The hyperplasia of connective tissue that takes place around an abscess could not occur if the micro-organisms were able still to cause the death of tissue they manifested on their first introduction. An abscess does not get well and does not spread because it is, or is not, respectively encysted by an abscess wall. Even when the abscess has been opened and the lesion is disappearing, pus can still be seen in contact with tissues where there is no wall to cause its limitation.

However small, or however great, the part played by inflammation in these events, all these observations definitely show that susceptibility to infection and immunity, phagocytosis and repair, and not inflammation, are the most important factors in the formation of and recovery from an acute abscess.

PHYSIOLOGY OF THE GALL-BLADDER AND ITS FUNCTIONAL ABNORMALITIES*

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III.

Abnormalities of Concentration and Secretion in the Gall-bladder

THIS subject, obviously a large field for investigation, is still very little understood. The details of the process in health are still uncertain. For one thing, the obtaining of the material is so difficult ("B" bile, as I have said, is only partly, and to an uncertain extent, derived from the gall-bladder, and post-mortem bile is open to objection). Then the time needed to perform all the necessary chemical estimations is so great that it would be a difficult subject for anyone but a whole-time research worker. Lastly, the work must be done on man; the bile of animals is so different in composition that, although animal work may be useful to physiology, its results are not directly transferable to human pathology. Let us see what is known about the fate of individual bile constituents in disease, to compare with what has been said about the normal.

*The Goulstonian lectures for 1933, delivered before the Royal College of Physicians of London on March 7th, 9th, and 14th. Lects. I. and II. appeared in THE LANCET of April 15th and 22nd.

Cholesterol and bile-salts are treated in a peculiar way by the abnormal gall-bladder. When inflamed, the gall-bladder wall loses its selective power and becomes like a collodion dialysing sac, so that in cholecystitis the concentrating function becomes abnormal. Instead of absorbing a little of the bile-salt-cholesterol addition compound, it absorbs the bile-salts alone, and to a great extent or even entirely. The cholesterol is left behind, and being deprived of its solvent substance precipitates. This fact, obviously of great importance in the pathogenesis of gall-stones, was first described by Rosenthal and Licht in 1928 [29] as a result of work on dogs. Knowing nothing of this work, I investigated for Prof. Aschoff the bile-salt and cholesterol content of the bile from post-mortem human gall-bladders, with and without gall-stones, and found that although the absolute quantity of bile-salt and cholesterol varied enormously (because of different degrees of concentration) the relation between the two was strikingly altered in cases of faceted (inflammatory) stones. Normally the ratio "bile-salt over cholesterol" is about 18, in bile from gall-bladders containing faceted stones it is about 2·5, and in bile from cases of pigment calcium stones it is normal. I misinterpreted these facts as indicating a disordered secretion by the liver and take this opportunity of acknowledging my error publicly. Schönheimer and his colleagues [3] in America subsequently confirmed my results and those of Rosenthal and Licht. There is now, therefore, an adequate explanation of the source of insoluble cholesterol for the formation of the inflammatory types of gall-stone; and chemical evidence for the inflammatory origin of faceted stones and the non-inflammatory origin of pigment calcium stones. Of the bile-salt-cholesterol ratio in cases of cholesterol solitaire stones nothing is known.

The inflamed gall-bladder wall can probably secrete cholesterol in small amounts; the fluid in hydrops of the gall-bladder contains usually little,[28] but sometimes considerable quantities,[25] and, of course, most inflammatory exudates contain cholesterol. This gall-bladder-secreted cholesterol does not, at any rate in most cases, lead to gall-stone formation.

Bilirubin.—When bile is allowed to stand, either in vitro or in the gall-bladder, the bilirubin is to some extent oxidised to biliverdin, and to some extent precipitated. This precipitate takes the form of globular droplets, which change into peculiar rod-shaped crystals, red-brown in colour, transparent, lying singly or in rosettes (my "Crystals 187," Schrade's "Microlith 2" [32]). In small numbers these crystals are often seen in post-mortem bile, but they are present in enormous numbers in cases of hæmochromatosis and of pigment calcium stones, and in the gall-bladders which I described in the last lecture as representing atonic distension. From the type of case in which these crystals appear, then, one can say that they are the result of either a great increase in the amount of bilirubin excreted into the bile by the liver, or of a great concentration of bilirubin in the bile by the gall-bladder. These crystals are very easily separated and cleaned by spinning and washing the bile, and when so isolated have all the physical and chemical characteristics of that form of bilirubin which gives the delayed van den Bergh reaction ("Hæmobilirubin" of Harrison).[16] They are the source of the hæmobilirubin noted as present in the bile by Andrewes in 1924,[1] and are formed, I believe, by the simple conversion of cholebilirubin to hæmobilirubin on standing which was described in 1928.[24] This conversion takes place much more rapidly at body than at room temperature, and is therefore more likely to be an intravitam phenomenon than the result of keeping the corpse in an ice-chest. These crystals are found in exactly the same circumstances as pigment calcium stones—namely, in association with certain diseases of the liver, of which hæmochromatosis is the best example, and in the thin-walled, distended gall-bladder with a mucous membrane stained black by absorbed bilirubin. How these crystals could lead to stone formation is not known (no work has been done on the question), but the relationship between them offers as likely a starting-point for investigation as the two main modern theories of the origin of this type of stone: (1) Westphal's precipitation due to high concentration of bilirubin,[37] and (2) Schrade's precipitation started by the falling out of heavy metals, especially copper.[32] The first theory is supported by experimental evidence with which I shall deal later, the latter covers many facts, but is entirely hypothetical.

Protein is secreted into the gall-bladder only as a result of inflammation, and as a constituent of the inflammatory exudate. It is of the highest importance in gall-stone formation. Those gall-stones which are generally considered to be of inflammatory origin, of which the faceted stone is the commonest and the type-example, are built on a radially arranged protein ground structure.[4] The calcium which they contain is a very small and unimportant constituent pathologically, and is always mixed up with the protein morphologically, as if it were a secondary and incidental deposit conditioned by the presence of the protein. The protein is found mostly in the centre of the stones, becoming scantier towards the periphery, as if the growth of the stones was conditioned by the continued precipitation of protein, cholesterol crystallising either by virtue of the electrical charge the protein carries,[21] or because it provides the "active surface" for crystallisation. It would lead me too far from the subject to discuss this aspect of the origin of gall-stones here; I intend to deal with it elsewhere.

Calcium.—The gall-bladder is sometimes found full of a sort of thick cream of calcium carbonate, or a little of this calcium emulsion is found in the mucus of a gall-bladder hydrops.[25 26 10] The consistency varies from milky fluid to semi-solid or even solid pliable concretions, filling the gall-bladder. This extraordinary production of calcium is especially associated with cystic duct obstruction.[27] Whether the calcium is necessarily a replacement of a preceding empyema is not known, but it is secreted into the gall-bladder by its own walls, probably as a result of infection. The calcium salts take the form of amorphous deposits, fine needle crystals, and sphærocrystals, the "calcium microliths" of Askanazy,[7] who considered them the origin of macroscopic gall-stones. They have been described by many writers [25 32] q.v. for references.† Their laminated and radial structure make them look so like microscopic gall-stones that it was natural to imagine that they might be gall-stone nuclei, but the resemblance is only superficial. The organised nucleus of a gall-stone is many times the size of a microlith, and contains nothing resembling one. Indeed, their irrelevance to gall-stone formation is demonstrated by finding them as passive inclusions in the outer parts of stones, where they lie between the cholesterol crystals "like bullets in a skein of silk," as Rous and his colleagues said.[21] Schrade has also reported this,[32]

† Schrade [32] misunderstood me to have thought these microliths rarer than the cholesterol variety; they are not. The error lay in my German; if it had not been extensively edited, it would have led to many more misconceptions.

and I have seen it myself. The prevalence of this type of microlith in cases of cirrhosis of the liver, reported from Geneva,[7] is not true of cirrhosis in England. Cases of cirrhosis appear to be similar in Baden and Geneva, in that there is much free iron in the fibrous stroma, whereas in England there is none. That is to say, ordinary cirrhosis has resemblances to hæmochromatosis in districts where the latter disease is common, and presents a different appearance in England, where hæmochromatosis is rare. The presence of this excess of calcium may explain the common association between ordinary cirrhosis and pigment calcium stones abroad, and its rarity in this country. This type of microlith may easily be distinguished from the rarer cholesterol form (which it resembles in general appearance and in its property of giving Maltese cross figures with crossed Nicol prisms) by its ready solubility in dilute acids. Calcium microliths can only exist in alkaline bile. The minute stones made by Rous, McMaster, and Drury,[30] which led to the suggestion that acidification of the bile was a gall-stone-preventing property of the gall-bladder, were calcium microliths.

"*Fatty acids*" are a normal constituent of gall-bladder bile; according to Hammarsten bile contains 10·8 per cent., but later analyses give a much higher figure: 43–780 mg. per 100 c.cm.[11] So little is known about their origin and use that it would be unnecessary to mention them were it not for the question of the relation of amorphous bile sediments to gall-stone formation. I include this here because I believe that these amorphous sediments, which have been referred to as composed of protein, bilirubin calcium, and other substances,[34 20] without any evidence beyond their yellow colour, are, as a matter of fact, composed of fatty acids. The evidence for this view is that they give none of the microchemical reactions for other substances and that they behave like fatty acids to concentrated sulphuric acid. These amorphous sediments were first thoroughly described by Torinoumi,[34] whose descriptions I followed in my own work on the subject.[25] Schrade,[32] in his work on bile precipitates, leaves them (quite rightly, I think) almost unmentioned. They are of absolutely no significance in the formation of ordinary gall-stones, in which, if they are present at all, they are found only as passive inclusions. I have one stone composed of three "raspberry" infective stones, embedded in a mass of this amorphous substance, the whole encapsuled in a shell of organised cholesterol. This type of stone is not, as far as I know, described, and must be excessively rare and unimportant, except in so far as the finding of one stone made up of structureless debris shows conclusively how different such a stone is from all ordinary gall-stones, and therefore how improbable it is that an ordinary gall-stone is formed in this way. Amorphous sediments are only rarely seen in bile obtained by the duodenal tube, in contrast to their almost invariable presence in post-mortem bile, and I am inclined to doubt what I once said, that these precipitates are always formed during life. In any case, it is time they were abandoned as a subject of serious investigation, at any rate with respect to gall-stone formation.

The Relation of Dyskinesia to other Disease Processes

"STASIS"

The concept of stasis has occupied, in the past, such a very large place in the pathology of all gall-bladder diseases that it is very important to discuss what it means and what part it actually plays. Unfortunately it has for years been a "blessed word," like Mesopotamia, and has been vaguely invoked to explain anything for which there has been no other adequate explanation. Stasis, in itself, is no explanation for anything. It is possible that it is a condition for the evolution of other processes, but it is these other processes, the connecting links between stasis and the disease brought about, that are important. And it is exactly these connecting links that have been ignored, or interpreted in terms as vague and speculative as the primary notion of stasis. Two years ago an important attempt was made by Nuboer[26] to attach a definite meaning to the word and to analyse the process. The first point to understand is this: stasis means a standing still, such as, in the case of the gall-bladder, is produced by ligature of the cystic duct, and to avoid confusion with a word of vague significance I shall refer to it as "standstill." This is not the same as an intermittent obstruction or an impediment to the outflow of bile, without a corresponding obstruction to influx. This latter state corresponds to that existing when, as in spastic distension, bile cannot flow *out* of the extra-hepatic biliary system, but can flow *into* the gall-bladder as soon as concentration provides room for it. Of course, when concentration has reached its limit a state of standstill supervenes in the gall-bladder. For this progressive concentration process we have no word in English (the German word *Stauung* describes it admirably), and I propose in this lecture to use for it the word "distension."

Let us first consider *distension*, which I would define as the state in which outflow is reduced in relation to inflow. This is not in itself a pathological condition, because between meals and during a fast it is physiological; it becomes pathological when due to other causes or when lasting too long, the borderline between the two being very ill-defined. Its essential result is concentration of the bile, which, when the state is pathological, proceeds to such a degree that no further concentration is possible, when a condition of "standstill" supervenes. As a factor in the pathogenesis of further disorders its importance depends on the time-factor, and if the gall-bladder empties to a normal extent even infrequently it is difficult to see how it could be of any importance at all. Indeed it would be safe to say that "distension" alone, if it did not lead to a "standstill," could not be important either in the origin of cholecystitis or of gall-stones. As a factor in gall-stone formation one can say definitely that it is unimportant, because the precipitates formed by simple concentration or thickening are resoluble in fresh liver bile, therein differing entirely from gall-stones, which are all insoluble in the hepatic bile of the man or animal in which they are found. If the process of concentration leads to irreversible precipitation, it is either because the secreted liver bile is abnormal or because the process of concentration is abnormal (as in the inflamed gall-bladder), and in such cases the important factor is not the "distension" but the other abnormality.

Standstill, or stasis in the strict sense, may be brought about in the gall-bladder by continued "distension," by *complete* obstruction of the cystic duct (by ligature, stone, neoplasm, or fibrous structure), or by peritonitis. In "standstill," one gall-bladderful of bile is retained in the gall-bladder without loss or addition. That this may lead to hydrops or cholecystitis (vide infra) is certain. That it is a primary factor in gall-stone formation is almost universally stated. Is this true? It is to be noted that *how* the "standstill" leads to gall-stone formation is very rarely stated. There are two principal

explanations: (*a*) that standstill leads to decomposition of the bile, and (*b*) that, but for standstill, cells and cell debris, minute infant stones, &c., would be washed away and have no opportunity to develop.

(*a*) *Decomposition of the bile* was once a popular conception, and Thudicum evolved a very elaborate scheme of events in the spontaneous alteration of bile by keeping samples in bottles for years.[33] Such changes, under highly unnatural conditions, are not taken very seriously to-day. The alteration which bile undergoes in a bottle in 18 months has little relation to its fate in the living gall-bladder, and "decomposition" to-day refers rather to such abnormal processes as the selective absorption of bile-salts by the inflamed gall-bladder. Now that these abnormalities of concentration are beginning to be understood, the need for the concept of "stasis" is disappearing. The process of concentration is indeed so rapid that "distension" is sufficient, even of simply physiological duration. And so again the magic word "stasis," on analysis, disappears from the list of primary causal factors.

(*b*) *The retention of products.*—Cells, cell debris, and amorphous deposits do not constitute the nuclei of gall-stones, and are only found in such as incidental inclusions. Indeed, cells are never found in gall-stones, and cell debris as a nucleus component is entirely hypothetical. Minute infant gall-stones are very questionable bodies. The two rival schools of Aschoff and Naunyn agree, curiously enough, that both cholesterol solitaires and faceted stones are built up exceedingly rapidly, and are probably at least ½ to 1 cm. in diameter from the beginning (except in the case of small multiple faceted stones). It must be admitted that this is hypothetical; in fact one must preserve an entirely open mind about it. From the point of view of "standstill," it does not matter, because the important point is that it is perfectly easy for small bodies to be left behind in the normal gall-bladder.

The gall-bladder is usually attached to the liver by a flat surface, which means that it cannot, as a rule, empty completely. A perfectly empty gall-bladder is rarely found post mortem or at operation, even in cases of death from street accidents while digestion is proceeding, or of emergency operations without preliminary preparation by starvation. Instances of an empty gall-bladder have been reported,[18] this alone stresses its extreme rarity. Cholecystogram series demonstrating emptying of the gall-bladder (such as the one I showed in the last lecture), and experimental work on complete emptying of the gall-bladder in animals (usually done on cats) are in general quite obviously taken from those individuals or species which have a completely detached gall-bladder, which can naturally empty abnormally well. The great majority of us go through life with a few cubic centimetres of "residual bile," to borrow a term from the urologists. This "dead space" which never empties has been particularly stressed by Lichtwitz.[20] In this residual bile, debris and minute stones could be retained just as efficiently as they would be by a more inadequate emptying, because the heavier material from the fundus would be the last to be expelled. One point would be of great interest; a collection of a large number of cases of mobile gall-bladders, and a statistical investigation into the percentage of those which contained stones, as compared with the statistics for the common sessile gall-bladder. One aspect of this question (Westphal's experimental gall-stones) I am leaving for a moment, but apart from this I think you will agree that, on analysis, the concept of "stasis" as a major factor in gall-stone formation disappears entirely, and that as a secondary factor it must be "relegated to a very minor place." This is why I did not go into details about corsets, constipation, and the rest as factors causing biliary dyskinesia. The careful disproofs of their importance only lead, from another aspect, to the same conclusion as the above discussion. "Standstill" remains a condition for the spontaneous change of cholebilirubin to hæmobilirubin, and its precipitation, and therefore may be a contributory factor in the ætiology of those pigment calcium stones which are not due to an excessive secretion of bilirubin by the liver. Even this suggestion is hypothetical, and until we know more about it to think we are explaining gall-stone formation by the word "stasis" is only to inhibit further research.

CHOLECYSTITIS

The ætiology of cholecystitis is an extraordinarily difficult problem, on which it would be easy to give three long lectures. It involves three main questions: What organism is responsible? How does it get into the gall-bladder? How does it set up inflammation? It is, of course, impossible to deal adequately with the subject here, but I must say a word about the possible contribution of dyskinesia to the process, since again "stasis" has been invoked as a causal factor. Ligature of the cystic duct experimentally almost invariably leads to cholecystitis,[2] whereas ligature of the common bile-duct does not, as a rule. This is very difficult to understand, but it is an established fact and therefore must be faced. It is perfectly possible (indeed it is known for certain) that a stone impacted in the neck of the gall-bladder or cystic duct may lead to cholecystitis. The neuromuscular dyskinesias, however, depend essentially for their production on abnormality of the ampulla of Vater or sphincter of Oddi, and therefore correspond rather to ligature of the common bile-duct, so one must be more careful in drawing conclusions. Impaction of a faceted stone in the ampulla cannot be adduced as evidence, because the presence of this type of stone can be taken as indicating, not only of a previous infection of the bile, but also of a previous infection of the gall-bladder. This is a very different matter. Infection of the bile means simply the presence of organisms in it, a not uncommon, possibly universal occurrence; infection of the gall-bladder implies more; it means infection in the strict sense, the gaining of a foothold by organisms in living tissue, provoking inflammation. And if this true infection was there before, a lighting-up of it by an impacted stone is not of the same significance as its primary production. Not the same, but still significant. It implies that "standstill" of the bile does in the same way facilitate the true infection of the walls of the extrahepatic biliary system, and suggests that this might be facilitated by "standstill" in the case of the original cholecystitis. Please notice that we are already in the air, theorising beyond our evidence, though in accordance with it. All I would say is that it is possible that some cases of cholecystitis have been contributed to, possibly even essentially contributed to, by "standstill." And there are two facts which make this theory superficially probable: (*a*) that clinically some cases of cholecystitis, after operation, are found to be suffering from the same symptoms as before, symptoms which are dyskinetic in origin; and (*b*) that one probable portal of entry of organisms to the gall-bladder wall is the crypts of Luschka, and that these undergo alterations in dyskinetic states.

A few words about these two pieces of evidence: (*a*) The clinical evidence is an ascertainable fact, not a theory. It is true that cholecystitis or "outfall" of the gall-bladder can lead to spastic distension, but the important point is that the symptoms are the same before and after cholecystectomy, and that if cholecystitis were *causing* the dyskinesia, removal of the gall-bladder should lead to disappearance of the reflex motor disorder. I think this evidence is sound, and does suggest that occasionally dyskinesia may contribute to the origin of cholecystitis. (*b*) The crypts of Luschka are certainly deepened as a result of dyskinesia,[6] and the analogy between cholecystitis and appendicitis suggests a similar process—namely, that infection of the bottom of a crypt of Luschka, deep in the muscularis of the gall-bladder, may set up the essentially subserous inflammation which is so common in cholecystitis, just as infection of the lymphatic tissue-lined clefts in the mucosa of the appendix may lead to the early subserous inflammation in this organ. But this is all hypothetical, and it is no use trying to bolster up one theory by adducing another in support of it. That is done much too often, and I decline at present to accept this analogy between the gall-bladder and the appendix as evidence.

STRAWBERRY GALL-BLADDER

This morbid anatomical state of the gall-bladder mucosa has recently been elevated to the position of a "disease," without, I think, very adequate reasons. It consists simply of a loading of the lining membrane with lipoid droplets, some in the columnar cells, but mostly in histiocytes lying in the stroma of the folds. That the droplets are lipoids, largely cholesterol esters, is inferred from their reactions to stains and to polarised light. In its earliest stage this deposition of lipoids is seen as a fine stippling along the crests of the folds of the lining membrane; as it advances, lipoid-laden histiocytes become more and more numerous in the stroma, and ultimately large lipoid masses form which even become pedunculated and hang like minute yellow grapes, suspended by a fine thread, into the gall-bladder. The process is evidently one of absorption from the bile outwards into the gall-bladder wall,[35 34 5] although large droplets of lipoid may possibly be extruded from the mucosa into the bile after they have been formed. (This appearance in microscopical sections is usually due to the plane of section; the pedicle not being included, the mass of lipoid has the appearance of a separate droplet.) The droplets of lipoid in the stroma, even when free from histiocytes, are never found surrounded by foreign-body giant cells, as are locally formed deposits of cholesterol. The majority of gall-bladders so affected show evidences of inflammation,[17 12] but are sterile on bacteriological examination. This suggests a very mild inflammatory process, which is confirmed by the frequency with which the "raspberry" type of infective stone is found in association with strawberry gall-bladder, and the infrequency of cholesterol solitaires.[15 5] Experimentally the strawberry state has been induced in rabbits by combined cholesterol feeding and injection of streptococci into the gall-bladder wall.[17] There is every reason to think that some, and probably the majority of, cases of strawberry gall-bladder are the result of a mild infection. The mechanism of the process would be: infection, absorption of bile-salts, precipitation of cholesterol and fatty acids to form a "lipoid mixture," absorption of the lipoid by the lining cells of the gall-bladder. Damage to the lymphatic drainage by subserous inflammation (which also produces the "opacity of the surface of the gall-bladder," which the surgeon takes as evidence of inflammation) would assist in the lipoid infiltration by preventing transport away from the gall-bladder. There are two other possible causes, (*a*) metabolic and (*b*) dyskinetic.

(*a*) *Metabolic.*—Excess of cholesterol in the bile, or more likely, decrease in bile-salt secretion by the liver, might lead to the same result as absorption of bile-salt by the inflamed gall-bladder wall. Illingworth was unable to produce cholesterosis of the gall-bladder in rabbits by excessive cholesterol feeding alone, but Dr. Seemann once showed me pictures of strawberry gall-bladders which he had produced in dogs by this method. I cannot find that he has published his results before returning to Soviet Russia, but similar results have been reported by Blaisdell and Chandler [8] who stressed the metabolic origin, therefore this must be mentioned as a possibility. It does not seem to me to be likely to be an important cause of cholesterosis, and the increase of cholesterol in the bile as a result of metabolic disturbance is too much in the melting-pot at the moment to make it possible to dogmatise.

(*b*) *Dyskinetic.*—A great deal of work has been done on the absorption of cholesterol by the gall-bladder under the influence of the two kinds of stasis, but the results have been inconclusive and, to tell the truth, the experimental work has been so crude and simple that not very much could be expected of it.[19] It is a very difficult subject for experimental treatment. The bile-salt : cholesterol ratio is not, apparently, affected by simple retention of bile in the gall-bladder.[14] Westphal [27] (p. 164) found evidence that under the influence of vagal stimulation the gall-bladder is not only dyskinetic, but differs also from the normal in its absorption power, in that cholesterol is absorbed from the bile by the gall-bladder wall, there to appear as ester-infiltration (the strawberry gall-bladder of man). This work is open to criticism on the score that it was done on dogs with the cystic duct tied, which almost invariably leads to cholecystitis. However, this work and the clinical case of spastic distension described, unwittingly, by Illingworth,[17] which was found to have a strawberry gall-bladder, make it possible that dyskinesia may be the origin of some cases of this abnormality.

Two points emerge from this discussion: (*a*) that strawberry gall-bladder seems to be due, as a rule, to mild cholecystitis, but that dyskinesia and metabolic disturbances may at any rate contribute to the process; and (*b*) that strawberry gall-bladder is definitely a product of other well-recognised processes and not worthy to be classed as a disease sui generis.

MIGRAINE

It has occurred to many that when patients refer to migraine as a bilious attack they are nearer the truth than they realise. In France especially the idea that migraine is sometimes associated with biliary disorder has gained ground, and a special type, "migraine biliaire ou duodenale," is described. Chiray and Pavel [9] attribute it to dyskinesia, and state that it is greatly relieved by non-surgical drainage of the bile passages. Of the three cases I have seen, only the last has been properly investigated (at her own doctor's suggestion), and I feel I have made a great mistake in missing opportunities. This case was an ideal one for investigation, because the migraine was associated with menstruation and it was therefore easy to obtain data of her state before, during, and after an attack. These results have already been referred to by Dr. Macdonald Critchley, to whom I gave them for his lecture to the Harveian Society. Briefly, what I found was a rise of blood bilirubin and blood cholesterol during an attack, with a fall to normal afterwards, in association with an atonic distended gall-bladder and a low bile cholesterol content. This suggests to me, very forcibly, an hepatic insufficiency, of intermittent occurrence, accompanied by migraine. The biliary dyskinesia is not in itself the cause of the migraine, because the former is continuous and the latter only occasional. One case is useless for inference, so I will make none. As a pointer, indicating a line of investigation, one case is invaluable; that is why I

mention it. The question to be investigated is this: does the dyskinesia lead to the intermittent liver function failure, or are the abnormalities of liver and biliary system two results of a common cause?

GALL-STONES

Possible relationships between the functions of the gall-bladder and the origin of gall-stones are so important that I have discussed various types of stones already under different headings. It remains only to discuss stones made artificially by experimental dyskinesia and to collect together what I have said before. Westphal regards biliary dyskinesia as the essential cause of gall-stones, and looks on this aspect as being the most important in the whole question.[37] Apart from his work on the formation of bile sediments in experimental dyskinesia, he has made laminated "stones" in dogs by ligature-induced stasis of the "distension" type of 172 days' duration. The "stones" were of pin's-head size, laminated, and containing a central cleft, like human faceted stones. Apart from any criticism of the transferability of the results of such a technique to the explanation of human disease processes, these stones cannot be allowed more than a superficial resemblance to human gall-stones. They were not composed of cholesterol (human faceted stones contain about 96 per cent. of this substance), the laminæ consisted, as did the central mass, of structureless granular material, and the central mass showed none of that rosette formation which is characteristic of the human faceted stone nucleus. The mere fact of lamination is of little significance; deposition in successive layers is not seen in gall-stones alone.

The human faceted stone is a highly characteristic structure. It has a rounded nucleus about a third the diameter of the whole stone, built up of rosettes of cholesterol crystals, the space between the rosettes being filled with protein and bilirubin calcium. Round the nucleus are deposited successive layers of radial cholesterol crystals, continuing the crystallisation-lines of the rosettes. At intervals, between the layers, lie thin laminæ of protein, impregnated with bilirubin calcium. The concentric laminæ successively alter the shape from the original sphere of the nucleus to the tetrahedral or other faceted form of the final stone. In the nucleus contraction of the colloid protein, which takes place as the colloid ages, leads to the formation of the central split, because the laminated shell round the nucleus is now too strong to fall in, so that contraction has the effect of splitting the nucleus from within outwards.

All these points provide morphological and chemical criteria to which any experimental stone must conform before it can be accepted as a reproduction of the human faceted stone, and on these criteria the experimental stones of Westphal break down. It is possible that Westphal's stones represent a different form of human gall-stone: the rare laminated bilirubin-calcium stone, but so little is known of this that it would be purely speculative to hazard the suggestion.

What, then, is the relation between dyskinesia and gall-stone formation?

(*a*) With faceted, barrel, and raspberry stones it has nothing whatever to do. Naunyn's theory that these stones are inflammatory in origin,[23] based originally on bacteriology, supported on morphological evidence by Aschoff and on chemical evidence by later workers, remains unshaken.

(*b*) One group of bilirubin-calcium stones, that found in thin-walled ectatic gall-bladders corresponding to atonic distension, are probably due to the motility disorder primarily, other stones of the same sort (found in hæmochromatosis and acholuric jaundice, for instance) are metabolic in origin. The laminated bilirubin-calcium stones may be due to dyskinesia.

(*c*) Soft white calcium carbonate stones are the result, in some unexplained way, of cystic duct obstruction, but of other than dyskinetic origin. The hard greenish calcium carbonate stones contain much copper and are probably related pathologically to the metabolic pigment-calcium stone.

(*d*) The cholesterol solitaire has probably nothing to do with dyskinesia.

(*e*) Earthy stones, found in the common bile-duct and round foreign bodies, require infection as a contributory factor,[22] and the "standstill" of the bile which constitutes the other factor is, as a rule, not due to a simple dyskinesia. We do not know whether dyskinesia can ever contribute to their formation; there is no evidence to support it, and only the negative evidence of their absence in dyskinetic cases against it.

I have dealt rather at length and for the most part destructively with the relation between biliary dyskinesia and other diseases, and I have occupied a good deal of your time in the discussion of the relation of the biliary tract to other organs. In so far as this has been tedious, I apologise, but it was done partly because a wide field is the proper subject for the Goulstonian lectures, and partly because I do not want biliary dyskinesia to be used as a loose explanation of other disease processes with which it has nothing to do. The significance of biliary dyskinesia is primarily clinical and practical. It offers an explanation and a treatment for a group of cases which have hitherto suffered much without relief, and have been a cause of nothing but dissatisfaction and trouble to their physicians. My account of these disorders has been, I fully realise, incomplete and unsatisfactory, and I bring it to a close in the hope that others will help me to remedy these defects.

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THE ACTION OF RADIUM AS SEEN IN THE PELVIS

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Radium and X rays have an astonishing ability to destroy living cells, and it is on account of this property that these agents are used to treat malignant growths. In the human subject treatment has to be local, for the destructive action is not diffuse, and distant or metastatic growths are not affected. If one wishes to know how this local therapeutic action comes about, two questions immediately need to be answered. I will not say two burning questions because most people think or assume that they are settled. The problems are, first: "Is the action a direct one damaging or killing the cells outright?" and secondly: "Is the destructive action selective for malignant cells, or are normal ones just as susceptible?" These two quite distinct issues are continually being confused, and it often appears that when a direct action has been demonstrated experimentally it is immediately regarded as proof of selectivity, and, vice versa, an apparent selectivity is taken as proof of direct action. On the whole it is true to say that most radiotherapists believe and base their treatment upon the assumption that destructive action is both direct and selective. As an example of this attitude the final report of the recent Radium Conference may be quoted.[1]

"The use of radium in the treatment of malignant tumours depends upon the empirical observation that in a large number of instances the cells of malignant tumours are destroyed by an amount of radiation insufficient to destroy normal tissues."

But later in the report it is admitted that—

"The margin between general destruction of the tissues and selective destruction of the malignant cells which are invading them is very small . . . ."

Belief in selective action is stated here, and throughout the report a direct action is implied.

THE GENERALLY ACCEPTED THEORY

The theory which is generally accepted at the present day could be illustrated by analogy with a game of ninepins. The ninepins are black and white and represent tissue cells. White ninepins are normal, and black ones, of course, malignant. One throws at them electric waves and β particles, and either or both of these agents can knock down the ninepins. That represents the direct hit idea. But according to the selective action theory, only black ninepins are knocked down. Like most analogies, this is a bad one, and it fails on the biological side because it pictures cells as isolated independent units and ignores the fact that in the adult organism they form tissues which are dependent for growth and maintenance upon a blood and lymph circulation. Apart from this consideration, there is ample evidence for the direct hit idea. It can be demonstrated on developing eggs of worms, on young chick embryos, on malignant cells in tissue culture, and on transplantable tumours. No better demonstration of this action could be devised than has been furnished by Dr. R. G. Canti. Those who have seen his beautiful film will have a vivid impression of the dying cells.

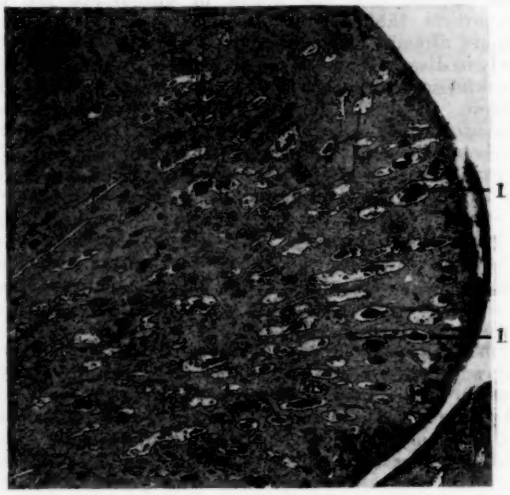

FIG. 1.—Segment of cervix showing hyperæmia and thrombosis of capillary blood-vessels (1).

All the types of cells mentioned above are isolated independent units, and they can be directly damaged or destroyed. I am not aware, however, that anyone has shown a difference in vulnerability between those which are normal and those which are malignant. To do so it would be necessary, for example, to expose twin cultures of sarcoma and normal fibroblasts to the same conditions of irradiation and to show that whereas one could be killed the other could not, or that a dose which arrested sarcoma cells in vitro failed to affect the development of a young chick embryo. No comparison of the effects on isolated normal and malignant epithelium is yet possible for the reason that they cannot be grown. Such controlled experiments have not, to my knowledge, been published.

SELECTIVE ACTION AMONG NORMAL CELLS

The assumption that in the adult organism a selective destructive action takes place is of recent origin. Workers in Germany at the beginning of this century were divided over this point, as may be judged from the discussion by A. Schafer.[2] They remembered that the first observed effect was a burn of normal skin and were aware of the discoveries that embryonic, reproductive, hæmopoietic cells, hair follicles, and sweat glands are extremely sensitive. It is generally believed now that extensive injury to normal structures which was formerly observed was due to excessive β irradiation at a time when screenage was not so thoroughly elaborated as it is to-day. I have formed the opinion from examination of actual organs treated by modern methods that selective destruction of tumours is apparent only and that normal cells still suffer. Indeed, if I were to arrange tissues in order of their sensitivity to damage by irradiation, even under modern conditions, I would place hæmopoietic cells a long way in advance of malignant ones, for the reason that, in order to

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destroy the latter, treatment has to be local, and it is generally accepted that as high and as even an intensity of irradiation as possible must be achieved in the area in which the neoplastic cells are growing. On the other hand, hæmopoietic cells are destroyed at a considerable distance from the source of irradiation where presumably the dose is weak and diffuse. For example, a sarcoma of the tibia may be eradicated by local applications, but its secondary growths, whether scattered throughout the body or near by, will be quite unaffected. The myeloid tissue of the same case, though scattered at least as far as any metastases, may be so damaged as to show leucopenia in the peripheral circulation or even an aplastic type of anæmia.

VASCULAR LESIONS

If one is to explain any apparent selective effect between normal and malignant cells, or between normal cells themselves, or between different varieties of malignant ones, assumptions are not going to help. It is necessary to start again by observing what happens in vascular tissue when it is exposed to radium, just as one would seek to know the action of any other physical or chemical agent such as heat or cold, electricity, acids or alkalis. It was with this object in view that I examined about 100 specimens each from operations and autopsies, all of which had been treated by radium or X rays. The first and most constant morphological change that I found was a lesion of blood-vessels. It starts as a simple hyperæmia, but eventually, if treatment is pursued, the vessels show signs of damage and all subsequent changes in the tissues can be related to the vascular disturbance. The vascular lesions lead to exudation of serum, to rupture and extravasation of blood, and to thrombosis. As I have pointed out elsewhere,[3] death of tissue follows from anæmic necrosis, and the resulting fibrosis induces pressure atrophy at a later

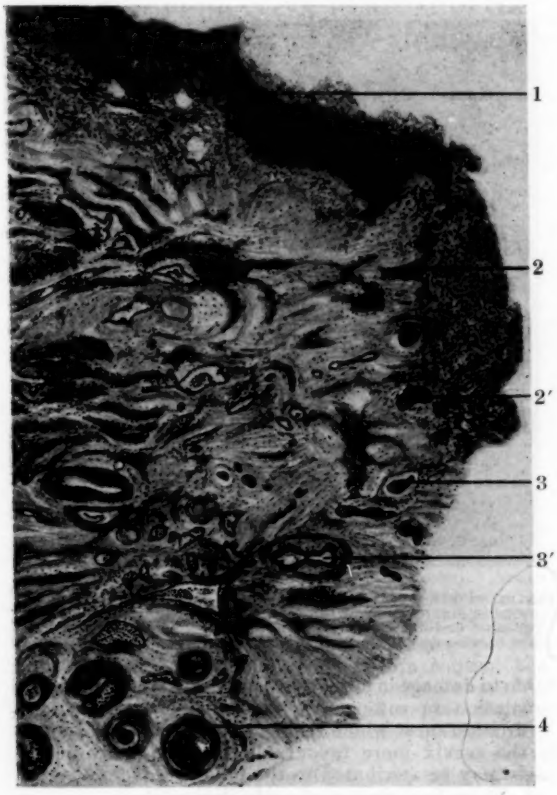

FIG. 2.—Segment of cervix showing replacement of epithelium by a structureless coagulum (1), thrombosis of capillary vessels (2 and 2′), alveoli of degenerating carcinoma cells (3 and 3′), organising thrombus occluding a large blood-vessel (4).

FIG. 3.—The portion between 2′ and 3′ in Fig. 2, magnified, showing structureless coagulum (1), thrombosis of capillaries (2), alveoli of degenerating carcinoma cells (3). (Section reversed.)

stage. These events have been described by several previous observers, notably Baermann and Linser, and Bashford, Cramer, and Murray, who attributed the death of the tumour to them.[4 5]

There have always been two objections to accepting these processes as an explanation of tumour destruction. The first is that the vascular damage was observed in tissue which was the site of previous pathological change, and it could be ascribed to tumour degeneration, to inflammation around the tumour, or to invasion of blood-vessels by the growth. The second is that selective action, or, as I would put it, *apparent* selective action, is not accounted for.

The first objection was met to a certain extent by the experiments of Bashford, Cramer, and Murray.[5] These workers followed the stages of tumour destruction, through hæmorrhage following irradiation, in transplantable tumours whose natural development was familiar to them. In order to show that thrombosis also could occur apart from any previous lesion, I endeavoured to produce it in normal rabbits. This was done by irradiating the surface of the lower abdominal wall by means of a wax plaque containing radium needles. No injury was caused to the skin; there was no irritation and no erythema. But deep to the uninjured skin, thrombosis could be found in numerous vessels in the serous coat of the bladder and accompanying the spermatic cord.[3] The same point, that thrombosis of normal vessels could occur in the absence of damage previous to irradiation, was demonstrated in the experiments of Strangeways and H. B. Fell on developing chick embryos.[6]

The second objection can be met if it can be shown that selection is apparent only and that normal

structures also are destroyed during the course of therapeutic irradiation. Figs. 1–6 illustrate the sequence of events following the vascular reaction in normal and malignant tissue.

FIG. 1 shows hyperæmia, thrombosis, and loss of epithelium. The drawing is a section from the anterior part of a cervix

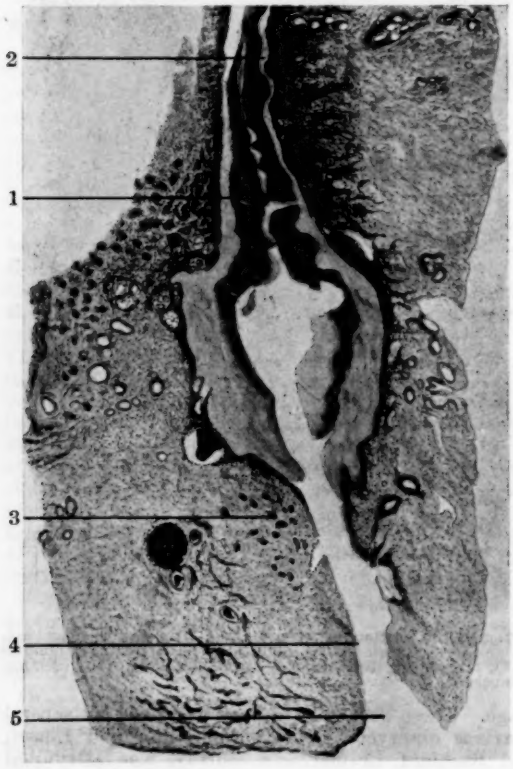

FIG. 4.—Portion of cervix and body of uterus showing replacement of endometrium by a structureless coagulum (1), zone of fibrosis between coagulum and uterine wall (2), remains of epithelium in cervical canal (3), absence of epithelial covering of cervical canal and cervix (4), and external os (5).

which had first been irradiated fourteen days previously for carcinoma. The patient developed appendicitis and died from general peritonitis within a few days. At autopsy a small carcinoma was found in the posterior lip of the cervix. Two surface applications had been made, each consisting of a total of 112·5 mg. radium element screened with the equivalent of 1 mm. of platinum for the uterus, and 1·3 mm. for the vagina, and 1·5 mm. of rubber. The radium applicators were left in situ for 24 hours on two occasions with an interval of a week in between.

FIGS. 2 and 3 show anæmic necrosis in the cervix following thrombosis. Epithelium has been replaced by a structureless coagulum in which the outlines of thrombosed vessels can be distinguished in the area 2′–3′, enlarged in Fig. 3. Just internal to this zone of necrosis several alveoli of surviving malignant cells can be seen, and it is probable that many more have perished in the coagulum. Since some of the large blood-vessels supplying the cervix, and shown in Fig. 2, are occluded by organising thrombi, it is probable also that in time still more of this tissue would have been destroyed. The uterus and cervix had been irradiated two months previously for cervical carcinoma, and the patient died from an intercurrent infection. Three surface applications had been made, consisting of a total of 125 mg. of radium screened with the equivalent of 1 mm. of platinum for the uterus, and 1 mm. for the vagina and 1·5 mm. rubber, and left in for 48 hours on three occasions with an interval of one week in between.

FIG. 4 shows anæmic necrosis of almost the whole endometrium of a normal uterus. In the drawing the endometrium is represented by a structureless coagulum—filling the cavity of the uterus. It is adherent to the uterine wall by a zone of fibrosis. In the cervical canal most of the dead tissue had been shed before organisation took place. No squamous epithelium remains on the cervix. This uterus had been irradiated four months previously, pending histological diagnosis of a small cervical polyp. The polyp proved to be innocent, and the patient was discharged well but returned to hospital five weeks later with symptoms pointing to disease of the gall-bladder. A laparotomy was done and a malignant growth was discovered. At the autopsy a primary columnar-celled carcinoma of the gall-bladder was found. Applicators containing 50 mg. of radium screened with 0·5 mm. platinum and 1·5 mm. rubber had been left in the uterus for 96 hours.

FIG. 5 shows complete destruction of endometrium near the fundus of the uterus and commencing organisation of the coagulum which has replaced it. Large blood-vessels in the zone of fibrosis between the uterine wall and the coagulum are occluded by organising thrombi. The uterus had been irradiated three months previously for an endocervical carcinoma. The patient did very well, but subsequently became nervous and asked to have her uterus removed, and this was done. Three surface applications had been made, each consisting of a total of 112·5 mg. of radium screened with 1·5 mm. platinum and 1·5 mm. rubber, left in for 24 hours at intervals of one week. The histological picture of this piece of endometrium is almost exactly like that of the uterus shown in Fig. 4.

The material on which these figures are based shows clearly that radium destroys normal tissue and malignant cells, and the lesions which result resemble anæmic necrosis. Therefore, to say that the margin between general destruction and selective destruction is small is hardly an accurate way of describing what occurs, but I should say rather that in fortunate but unpredictable circumstances more tumour cells will be destroyed than normal ones. On the whole, damage to the tumour is more extensive because (1) the dose is concentrated upon it; (2) the vascular supply of a neoplasm is carried on by means of capillaries which are imperfect and extremely

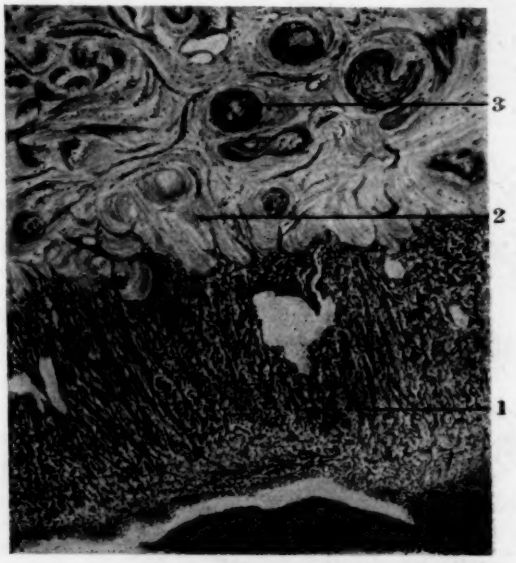

FIG. 5.—Portion of lining of the uterine cavity near the fundus, showing organisation of the structureless coagulum which has replaced endometrium (1), zone of fibrosis between coagulum and uterine wall (2), organising thrombus in a large artery (3).

liable to damage in any event; (3) there is no collateral circulation to compensate for damage.

Circumstances which render the course of treatment in the cervix more favourable than in many other parts may be attributed to the following factors:—

1. There is a chance of early diagnosis.

2. The growth occurs on a free surface where it is fairly easily accessible to irradiation. Dead and damaged tissue can be shed from the body.

3. In the natural course of events carcinoma of the cervix is limited to the primary site for a long time before it spreads or metastasises. If the whole growth is not immediately destroyed, there is yet time, owing to this natural late development, for the slow necrobiotic process set up by the rays to be completed long after treatment has ceased.

CONCLUSION

Thus to return to my original questions, the answers are, I believe, as follows: A direct damaging or lethal action can be demonstrated in all living cells. But there is, in addition, an indirect action which comes into operation as soon as one deals with organised vascular tissue. The indirect action destroys by damaging blood-supply. Neither of these deleterious effects is selective; an *apparent* selection can be accounted for by the concentration of dose on a tumour and the greater vulnerability of its blood-supply. In favourable circumstances, as in the cervix, a greater proportion of tumour is destroyed than of normal tissue, and consequently the tumour appears to be more sensitive. Damage to normal tissue, though it may be of no practical importance, can always be found somewhere.

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ACUTE SUPPURATIVE PERICARDITIS

TWO CASES SUCCESSFULLY TREATED BY OPERATION

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SUPPURATIVE pericarditis complicates many diseases in their terminal stages and is then of little clinical importance; but occasionally it occurs as the sole complication of suppuration elsewhere in the body and a favourable result may then follow surgical intervention. The object of this communication is, first, to discuss the relation between the pathological and clinical aspects of the condition and, secondly, to record two cases which were operated on successfully.

ÆTIOLOGY

The post-mortem records of the General Infirmary at Leeds for the 11 years 1921–1931 have been examined.[1] During that period there were 7965 autopsies, and in 214 of these (2·7 per cent.) acute pericarditis was found. Of these cases 144 were in males and 70 in females; the proportion of males to females in the total number of autopsies was 5 to 3. The first two decades of life showed the highest incidence (Table I.), and this is readily accounted for by the prevalence of acute infective osteomyelitis and of empyema thoracis in childhood and adolescence.

Infection of the pericardium may arise either directly, as a result of penetrating wounds, or by extension from foci of suppuration in the immediate neighbourhood of the pericardium, notably the pleura; or by way of the blood stream in cases of pyæmia. Suppurative pericarditis is but the end-stage of such an infection.

TABLE I.—*Age- and Sex-incidence*

Age-periods (years).	Male.	Female.	Total.
0– 9	44	23	67
10–19	24	11	35
20–29	12	6	18
30–39	19	11	30
40–49	19	9	28
50–59	19	6	25
60–69	6	4	10
Over 70	1	—	1
	144	70	214

PATHOLOGY

In the series of autopsies which we have examined, every grade of acute pericarditis has been observed. The mildest type is the *fibrinous* variety, in which a part or the whole of the inner surface of the pericardium becomes covered with a deposit of leucocytes and fibrin; in those cases in which, in addition to fibrin, much serum is exuded, the term *sero-fibrinous* pericarditis is used. The further advance of the infection results in the emigration of still larger numbers of leucocytes into the pericardial sac, resulting in the formation of frank pus; *sero-fibrino-purulent*, *sero-purulent*, and *purulent pericarditis* are the terms used to indicate sub-varieties of purulent pericarditis, and they sufficiently indicate the nature of the condition referred to. In a few cases of empyema and of osteomyelitis a very acute hæmorrhagic pericarditis has been noted.

The most practical subdivision of the cases is into the suppurative and non-suppurative pericarditis; our series shows 91 of the former and 123 of the latter.

An analysis of the 214 autopsies in which acute pericarditis was found shows that the primary conditions responsible for development of the pericarditis may be divided into simple groups: infective (excluding intrathoracic), 91; acute intrathoracic, 73; cardiac, 40; and unclassified, 10. The most important infective conditions are acute infective osteomyelitis, cellulitis, and carbuncle; the local chest conditions are empyema and pneumonia and, in four instances, suppurative mediastinitis; cardiac conditions include acute infective endocarditis, rheumatic endocarditis, and a number of cases of arterio-sclerotic Bright's disease. From the surgical standpoint it is of importance to study the ætiology more closely in the 91 cases of suppurative pericarditis. It will be seen from Table II. that one chief cause of acute suppurative pericarditis is empyema and pneumonia, and that the other group is due to pyæmic infection spreading from some distant focus, particularly from suppuration in bone.

THORACIC AND PYÆMIC SPREAD

Pericarditis resulting from acute intrathoracic disease.—An examination of those cases of empyema and pneumonia which were associated with acute pericarditis shows that the latter is about equally common with a right- or left-sided empyema. Under this heading it is suitable to mention that purulent pericarditis occurred in association with three cases of subphrenic abscess, while in one case a liver abscess had ruptured through the diaphragm into the pericardial sac. In the cases of empyema, there occurs at first an inflammatory adhesion between the mediastinal pleura and the parietal pericardium; this change is frequently found at

autopsy without a definite pericarditis. The infection then passes through the parietal pericardium and a pericarditis, at first fibrinous or sero-fibrinous and later purulent, is initiated. A similar sequence of events occurs in cases of acute pericarditis following subphrenic abscess or suppurative mediastinitis. The causative organism in those cases associated with empyema is usually the pneumococcus, but other organisms, often streptococci, have been found, especially when the empyema has been secondary to subphrenic abscess.

An interesting point in the cases in this group is the complete absence of any acute lesion in the heart muscle or in the coronary vessels; as will be shown later such lesions are common in pyæmic pericarditis. This fact provides very strong evidence that the pericarditis results from direct extension in this group of cases.

TABLE II.—*Primary Focus in Cases of Suppurative Pericarditis*

(1) *Acute intrathoracic disease (including subphrenic abscess).*	
Empyema	30
Pneumonia	8
Gangrenous mediastinitis	1
Carcinoma of bronchus	2
Bronchiectasis	1
Subphrenic abscess	3
	45
(2) *Acute infective conditions.*	
Acute osteomyelitis	17
Abscess, cellulitis, &c.	11
Mastoiditis with lateral sinus thrombosis	2
Peritonitis, various	5
Suppurative arthritis	2
Septicæmia	2
Liver abscess	1
	40
(3) *Cardiac conditions.*	
Acute infective endocarditis	3
Arterio-sclerosis, contracted kidney, &c.	2
Abscess in heart wall (no cause found)	1
	6

Pericarditis resulting from other acute infective conditions.—During the course of pyæmia acute suppurative pericarditis is frequently found; indeed, in acute osteomyelitis acute pericarditis is the most common pyæmic lesion. Thus, in 51 consecutive autopsies on cases of acute osteomyelitis, we have found that acute pericarditis of all grades occurred in 33 cases.[2] It is often the result, in such cases, of a tiny abscess or a septic infarct in the heart muscle. In our own series of 214 cases such acute lesions were discovered in the heart muscle in 17 cases, and in 11 of these the pericarditis had become purulent at the time of death. Each of the 17 cases occurred among the group of "infective" diseases. The causes were acute osteomyelitis (11 cases), cellulitis (2 cases), sacro-iliac arthritis, lateral sinus thrombosis, and prostatic abscess (1 case each); in addition, one patient—a child—showed at autopsy a purulent pericarditis caused by an abscess, half an inch in diameter, in the interventricular septum, for which no primary focus was discovered. The lesions in the heart muscle were either tiny solitary abscesses, or multiple small abscesses or infarctions.

In most cases which we have seen, suppurative pericarditis has not been the only pyæmic manifestation, but has been associated with abscesses in the lungs, kidneys, and, sometimes, other bones, while the state of the original incision for the drainage of the osteomyelitis is not healthy. But it is of great surgical importance to note that in a few cases the pericarditis may be the only discoverable pyæmic focus, and then it becomes possible to undertake surgical interference with some hope of success. If other foci exist in such a case, they are probably small and possibly disappear spontaneously.

The pericarditis which has been found in cases of suppurative lateral sinus thrombosis is sometimes pyæmic in origin, but it may also result from direct extension from a septic pulmonary infarction or from an abscess in the lung which so often complicates this disease. It is also probable that in many cases of peritonitis (local or general) following intra-abdominal operations, direct extension is more often responsible for pericarditis than spread by way of the blood stream.

CLINICAL MANIFESTATIONS

Attention is usually first directed to the pericardium by the patient's complaint of precordial pain or of pain in the epigastrium. The pain, however, varies much in intensity, and is not constant. At this stage there may be no rise either of temperature or of pulse-rate, but both may still be elevated from the primary disease. The respiration-rate may be increased on account of the pain caused by the respiratory effort and there may also be a dry cough. At this stage of the disease a friction rub, usually near the base of the heart, can be heard and, indeed, may sometimes be felt. For a day or two the pain persists and it then becomes more tolerable; the friction rub has now disappeared and a gradual increase in the area of cardiac dullness is found. At this stage there appears a most valuable clinical sign—viz., a rising pulse-rate due to embarrassment of the action of the heart by the accumulation of fluid in the pericardium—and the temperature may also show a rise. There is dyspnœa or even orthopnœa and cyanosis, and the patient is often very restless. The cardiac dullness is much increased and the cardio-phrenic angle tends to become obtuse. The heart sounds are muffled. Once the sac is distended with fluid, X ray examination is of great assistance and shows the shadow due to the distended pericardium. A dilated heart may cause some doubt on X ray examination, but a dilated heart will be seen to pulsate when viewed on the fluorescent screen, whereas the distended pericardium does not pulsate.

In those cases of suppurative pericarditis due to empyema, the symptoms may be as outlined above, but the physical signs may not be clear owing to the proximity of the empyema cavity. If a patient with empyema develops precordial pain and a rising pulse-rate, the possibility of a suppurative pericarditis must be considered. The diagnosis can be established by a skiagram and by successful exploratory puncture.

TREATMENT

Treatment may be by aspiration or by open operation. Aspiration has only a very limited application in the treatment of suppurative pericarditis. It is, of course, useful as an aid to diagnosis, but as a means of effective therapy its use seems to be largely restricted to the temporary relief of the patient's distress before operation. Rowlands[3] recommends that exploration with a needle be made through the costo-xiphoid angle, pointing out that the peritoneal cavity is not entered by this route. Lilienthal[4] points out that aspiration in the fifth left intercostal space entails a risk of damaging the internal mammary and coronary arteries and also of infecting the left lung and pleura.

Once the diagnosis of suppurative pericarditis has been made, open operation is the treatment of choice.

A local anæsthetic is to be preferred because the patient is usually critically ill; in the case of children this is sometimes apt to be rather difficult and then general anæsthesia, either gas-and-oxygen or light ether anæsthesia, is used. The operation occupies but a very short time and only small amounts of ether need be used; for this reason we feel that ether should always be used with a nervous patient.

Rowlands and Coutts [5] discuss the advantages and disadvantages of the different methods of approach. While simple incision in the fifth left intercostal space does not give adequate exposure, the reflection of a flap consisting of the fourth and fifth costal cartilages is usually a more severe operation than is desirable for so ill a patient. Excision of the fifth costal cartilage, with or without a portion of the gladiolus, does not give completely dependent drainage of the pericardium. The epigastric route, in which a left rectus incision is made and the peritoneum is pushed downwards to allow the pericardium to be exposed between the sternal and costal attachments of the diaphragm, often fails to give adequate exposure in adults, but is satisfactory for children. Rowlands [6] considers that in children resection of the seventh left costal cartilage with a portion of the gladiolus gives the best approach.

We treated both our cases by excising the fifth costal cartilage. The internal mammary vessels were then ligated and divided and the left pleura was retracted outwards. The pericardium was then incised and the edges were sutured to the subcutaneous tissues. A large drainage-tube was put down to but not into the pericardium, and the wound closed round the tube. By this method, which is both simple and effective, we achieved satisfactory drainage although the tube did not perhaps drain the lowest part of the pericardium; drainage of the pericardium depends to no small extent on the action of the respiratory and cardiac movements. By this method, too, the pleura can be easily seen and avoided and the internal mammary vessels are ligatured under direct inspection. In the two cases which we now report the above technique has proved quite satisfactory.

CASE REPORTS

CASE 1. Acute suppurative pericarditis following acute osteomyelitis of the upper end of the femur.

The patient was a boy aged 10 years. On Oct. 17th, 1929, he began to have pain in the neighbourhood of the right hip-joint; later he was unable to stand because of pain and was admitted to the General Infirmary at Leeds, under the care of Mr. H. Collinson, on Oct. 19th. On admission he had a flushed appearance, and lay in bed with his right leg flexed, abducted, and externally rotated. Temperature 100° F., pulse-rate 104. There was marked tenderness all round the hip-joint, especially in the upper part of Scarpa's triangle; there was acute pain when percussion was made over the great trochanter in the direction of the hip-joint. It was possible to obtain slight movements at the hip-joint, but the limb was held in a state of spasmodic contracture. The region of the hip-joint was slightly swollen. On Oct. 22nd the local symptoms and signs had become much more acute, and a diagnosis was made of acute osteomyelitis of the upper end of the femur, with probable involvement of the hip-joint.

First operation (L. N. P.) Oct. 22nd. Ether anæsthesia. The hip-joint was exposed by the classical anterior approach and was explored by passing an aspirating needle through the capsule, frank pus being obtained. The capsule was therefore incised and a considerable quantity of pus escaped. The femur was opened by chisel just below the upper epiphysis and pus was found in the bone, which was then further opened for about 2 in. Continuous irrigation with Quinanil [7] was installed. The causative organism was found to be the *Staphylococcus aureus*.

Subsequent course.—The temperature fell to normal within 48 hours, and the general and local condition improved. On the third day after operation he complained of pain in the chest, and an examination by Dr. S. J. Hartfall showed well-marked pericardial friction over the upper part of the right ventricle; on the next day no rub could be heard. By Oct. 28th signs of pericardial effusion had developed, there being a considerable increase of cardiac dullness with much diminution of the heart sounds. The temperature was still slightly raised, and the pulse-rate, which had settled to 90, rose gradually to 130. Radiography showed a greatly increased pericardial shadow. The pericardium was explored through the inner end of the fifth left intercostal space, sero-pus being obtained. It was decided to open and drain the pericardium.

Second operation (L. N. P.) Oct. 29th. In view of the boy's age light ether anæsthesia was used. The pericardium was exposed by excising the fifth left costal cartilage through a short horizontal incision. Several ounces of sero-pus were evacuated; a swab from this yielded *S. aureus* and a Gram-negative bacillus.

After the operation the condition improved rapidly. After the third day following operation gentle irrigations of quinanil were made through the tube into the pericardium. After a week the drainage-tube could no longer be retained. The wound gradually closed, and the boy was discharged to a convalescent hospital on Feb. 26th, 1930. Since that time he has been readmitted on two occasions, once for a Brodie's abscess at the upper end of the right humerus, and once for sequestrectomy on the femur. The pericardial wound is soundly healed.

CASE 2. Acute suppurative pericarditis following right-sided empyema thoracis.

A boy, aged 17 years, was admitted to the General Infirmary on Sept. 6th, 1930, under the care of Dr. G. W. Watson. He had had an apparently straightforward lobar pneumonia three weeks before admission, and had developed signs of pleural empyema at the right base. On the day of admission the right pleural cavity was explored, and thick pus, which yielded a pure culture of pneumococcus, was withdrawn.

First operation (A. B. P.) Sept. 6th. Novocain 1 per cent. infiltration with gas-and-oxygen anæsthesia. The eighth right rib was resected subperiosteally and the pleura incised. About 1 pint of thick pus was evacuated, together with much fibrinous exudate. The wound was closed with open drainage of the empyema cavity.

After operation the boy ran an irregular temperature which did not subside. The wound drained satisfactorily, but the patient's general condition became worse, and he developed dyspnœa and cyanosis. Towards the end of the month it became obvious that the boy had a pericardial effusion. On Oct. 1st Dr. Hartfall explored the pericardium, entering the needle on the left side of the xiphoid process. 300 c.cm. of thin pus were withdrawn. Culture gave a pure growth of pneumococcus. The boy's condition improved slightly, but he became worse again, and on Oct. 5th the pericardium was reaspirated, some 120 c.cm. of thicker pus being obtained. It was decided to open the pericardium on the next day.

Second operation (A. B. P.) Oct. 6th. Novocain 1 per cent., intercostal nerve-block anæsthesia. The pericardium was exposed by resecting the fifth costal cartilage. About 1 pint of thick greenish pus was evacuated. After the operation the condition improved quickly. Both wounds drained well, but an irregular temperature persisted until Oct. 23rd. About this time the empyema wound healed, but the patient developed marked œdema of the lower limbs and scrotum, and finally ascites appeared. At this time he was only passing about 12 oz. of urine per day, various diuretics having not the slightest effect.

On Oct. 19th paracentesis abdominis yielded 5 pints of clear sterile fluid. On the 24th the urine output suddenly rose to 120 oz. per day, and all the œdema rapidly disappeared. The pericardial wound only healed slowly, but the boy was eventually discharged cured on Jan. 24th, 1931. At the present time (February, 1933) he is quite well and is back at work.

SUMMARY

We have shown above that acute suppurative pericarditis has definite surgical importance. Apart from its frequent occurrence in terminal states, it occasionally exists as a focus of suppuration which admits of treatment. Though theoretically this can occur after any variety of either gross intrathoracic suppuration or septicopyæmia, in practice the two diseases which are most likely to give rise to an acute suppurative pericarditis which can be

recognised when operative treatment is still possible are pleural empyema and acute infective osteomyelitis. We have reported two cases in which successful operation was undertaken. In each of them adequate drainage was effected by removal of the fifth costal cartilage.

We wish to express our thanks to Mr. Collinson and to Dr. Watson, under whose respective care the two cases were, for permission to publish them.

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Clinical and Laboratory Notes

TREATMENT OF IMPACTION OF THE SHOULDER IN A VERTEX DELIVERY

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DURING the delivery of a large child difficulty is occasionally experienced in delivering the anterior shoulder from behind the symphysis pubis. This difficulty is usually met with in the delivery of a large child from a normal pelvis rather than in the delivery of a normal child from a small pelvis and after application of the forceps.

In these circumstances the attempt to pull the anterior shoulder from behind the symphysis pubis by traction on the neck is fraught with danger to the fœtus, since an Erb's palsy may result, or, if great force be used, the neck may be broken. If the index-finger can be inserted into the anterior axilla and the shoulder displaced from behind the symphysis pubis, delivery will be easily affected; but in many cases there is not sufficient room to allow the passage of the finger. An attempt to deliver by traction on the posterior axilla is usually impossible unless an episiotomy be performed.

In such cases I have found that delivery can be effected most easily by introducing the index-finger of one hand past the anterior fold of, and into, the posterior axilla; and while retaining this grip the child is forcibly turned through a half-circle so that the posterior shoulder, with the finger retained in the axilla, comes to lie underneath the symphysis pubis, and the formerly anterior shoulder comes to lie posteriorly behind the perineum. The rotation is in the direction of the child's back—i.e., in a presentation with the back pointing to the right, the movement is clockwise—but where the back is pointing to the left, the movement is anti-clockwise. At the same time that rotation is resorted to, traction is made upon the shoulder, so that the path followed by the posterior shoulder is a corkscrew one—namely, from behind forwards and from above downwards. In this fashion the posterior shoulder can be rotated anteriorly and brought under and external to the symphysis pubis, after which delivery is brought about in the usual way.

OTITIC CEREBRAL ABSCESS

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A GIRL, aged 15 years, was admitted to hospital under my care on Dec. 11th, 1932. She was sent in as a case of otitis externa of three days' duration. On admission there was pain and swelling of the right meatus, and slight otorrhœa. The temperature was 102° F. and there was no mastoid tenderness. On the following day definite mastoid tenderness had developed and the mastoid antrum was explored. It was found that there was extensive cholesteatomatous disease in the antrum and middle ear, the facial canal was eroded, the dura of the middle and posterior fossæ was exposed, and a large perisinus abscess was present.

After the operation the temperature dropped and the patient became drowsy and very irritable. Any questioning as to how she felt produced impertinent replies and any examination was strongly resented. No examination of discs was possible owing to her attitude. The pulse-rate, which on admission was 110, varied daily but gradually dropped to 65 and it was decided to explore her temporo-sphenoidal lobe for abscess. At this second operation, on Dec. 22nd, the old wound was reopened and cleaned, bone was widely removed over the temporo-sphenoidal lobe and the brain was explored. Three ounces of foul fæcal-smelling pus were evacuated and two drainage-tubes inserted in the abscess cavity. Her recovery was slow but complete. All signs of irritability have subsided and patient has been discharged home.

This girl was working in a shop and cycling 10 miles a day up to within 48 hours of admission to hospital. Though there was only three days' history of ear trouble given, the mother volunteered that the girl had had a running ear ever since babyhood but that condition was not thought to be serious. She had no definite symptoms of intracranial trouble until after first operation and no signs of vomiting, paresis, &c., at any time.

My thanks are due to Mr. E. W. Peet, house surgeon to the department, who performed the first operation and who was assiduous in patient's after-treatment.

PRINCESS ALICE MEMORIAL HOSPITAL, EASTBOURNE.—At the annual meeting of the hospital it was stated that the extension scheme, involving an outlay of £30,000, had been completed, and the full sum had since been received. The hospital accounts showed that the ordinary income to the general fund was exceeded by the ordinary expenditure by £1872. The average number of beds occupied during the year was 89, against 83. There were 79 motor accident cases treated, as against 67. These cost the hospital £1012, towards which only £149 was given by the patients. A similar sum was recovered from insurance companies.

WORTHING HOSPITAL.—The report for 1932 shows a deficit of £1168, as against £65 in 1931, when a special effort was made. The total deficit for the past four years was £4248. During a part of last year it was found necessary to close the maternity ward, and this alone accounted for a deficiency of £537 from patients. An appeal is being made to the public for £4000, so that the governors may claim for the hospital a like sum which has already been offered. With the £8000 it is proposed to reorganise the whole of the existing maternity ward and paying patients' ward as economic and efficient units, and to build eight additional nurses' bedrooms.

MEDICAL SOCIETIES

LONDON ASSOCIATION OF THE MEDICAL WOMEN'S FEDERATION

AN open meeting was held on March 28th, when Prof. M. LUCAS KEENE, the president, took the chair and a paper on the

Action of Radium as Seen in the Pelvis

was read by Dr. B. DAVIDINE PULLINGER. This paper appears on p. 902.

Prof. SIDNEY RUSS said that Dr. Pullinger had not attempted to explain selective action but rather to explain it away. It seemed an extraordinary thing to him for anyone to challenge the main facts of selective action, for they formed the basis of the whole of radiotherapy. So many examples lay in front of one, that he was rather at a loss to understand the attitude taken in the matter. He was frankly critical, in view of the complete lack of information on the quantitative side, of the claims which the speaker had made for the part played by thrombosis in the reaction of tumours to radiation.

Prof. E. H. KETTLE said he had been extremely interested in Dr. Pullinger's paper and he thought her work was a valuable contribution to the subject. He had always felt a little sceptical about the selective action of radium upon the malignant cell, for it seemed to him that the wish was possibly father to the thought. He did not know of any essential reason why the malignant cell should be especially vulnerable to rays, and in many conditions it seemed to tolerate insults which non-malignant cells were not able to resist. In some tumours he had examined some weeks after irradiation, for example mammary cancer, he had found apparently healthy malignant tissue which had a very different appearance from the degenerated cells of the remaining breast acini. There was a good deal of evidence to show that lymphatic tissue and bone-marrow were especially vulnerable and he would like to hear Dr. Pullinger's views on this selectivity. No one denied that radium had a remarkable local effect on malignant tumours, but this did not necessarily imply a specific action on the tumour cell, which would seem to be essential if radium therapy was to deal successfully with anything more than purely local growth. He thought that such studies as Dr. Pullinger's were likely to be of great help in the interpretation of the action of radium, and of consequent benefit to radium therapy.

Dr. HELEN CHAMBERS said that Dr. Pullinger did not discuss dosage although the problem of tissue reactions to radiation was entirely dependent upon dosage. It was a commonplace that any living tissue could be necrosed by radiation if sufficiently heavy doses were employed and from the sections shown the tissues looked as if they had been heavily overdosed. With interstitial treatment it was unavoidable that the tissues close to the radium tubes received much heavier doses than were necessary to kill cancer cells; the dose might be as much as ten times the lethal. Such tissues were unsuitable for studying radiosensitivity. The presence of vascular lesions was to be expected as a result of direct injury or as an after-effect of the necrosis produced and could not be looked upon as a necessary precursor to the malignant cells disappearing. The problem could be studied by the experimental method, with careful measurement of the radiation, using only just enough to cause tumours to disappear. When this was done necrosis of the tissues did not occur and the overlying skin of a tumour need not even be permanently epilated; the tumour cells could be killed and the skin through which the radiation had been applied, which had consequently received the largest dose, could be left undamaged. Dr. Pullinger spoke of erythema as an essential precursor in the disappearance of malignant growths, but was it? Although temporary erythema was looked upon as correct treatment at the present time, in Dr. Chambers's experience the growth cells often began to disappear before the erythema had developed. The tendency of clinicians was to push the radiation dose to the limit of tolerance of the skin and normal tissues, to give the maximum doses from which they could recover. Surely the object of research in radiotherapy was to arrange spacing and dosage so as to avoid these injuries and make the greater use of the facts of radiosensitivity. Dr. Chambers stated that her experience at the Marie Curie Hospital had included very few post-mortems; the only ones were those of immediate deaths. She had done only five although the hospital had treated over 900 cases of uterine cancer.

Dr. DOROTHY RUSSELL said that it seemed to her that Dr. Pullinger had given an extremely commonsense presentation of her subject, giving a reasonable idea of how the process worked. The only clinical material to which the speaker had had access consisted of gliomas exposed to radiation. It was well known that the most malignant form, medulloblastoma, was particularly susceptible to radium. This was difficult to get going in culture. Capillary hæmangioblastomas when plugged with radon seeds showed extraordinary regression. The form of glioma known as spongioblastoma multiforme, which was also susceptible to radiation, was generally very vascular. Dr. Pullinger had shown a circumspect unorthodoxy in her survey of the material at her disposal.

Dr. PULLINGER, in reply to Prof. Russ, said that she had been dealing with lethal action, which in her opinion was not selective for tumour cells, and that she had endeavoured to show that normal structures also are destroyed. Thrombosis could be found in tissues treated by the therapeutic doses commonly used. She had not had time to discuss the immediate cause of the hyperæmia. She agreed that it might be evidence of a high degree of selective damage to endothelium and vessel walls, but she was of the opinion that it was a response to some chemical substance of histamine-like nature produced in the irradiated area. Replying to Dr. Chambers, Dr. Pullinger said that hyperæmia followed doses commonly used in therapeutic irradiation. It was the first morphological change and preceded visible damage to tumours. It was the condition underlying erythema, which occurs in the skin, but when hyperæmia occurs in deeper structures it cannot be seen. It was a change visible with the aid of the microscope. Dr. Pullinger agreed that her material was derived from human sources alone, but after all radiotherapy had been devised for the human subject.

At a meeting on April 11th, with Dr. LETITIA FAIRFIELD, vice-president, in the chair, an address on

The Endocrine Basis of Uterine Bleeding

was given by Prof. OSKAR FRANKL of the Universitäts Frauenklinik in Vienna. Uterine bleeding, he said, was an important factor in the lives of both the

gynæcologist and the general practitioner. At one time the treatment was stereotyped, but nowadays we knew more about the causation of uterine bleeding, and could differentiate the treatment accordingly. In order to have a proper understanding of pathological bleeding it was necessary to consider the origin of menstrual bleeding. The old physicians used to say: "The uterus makes woman what she is." Later they modified their view, and said: "The ovary makes woman what she is." We knew now that the ovary was not an independent gland; both ovaries might be congenitally absent and yet the secondary sexual characters might appear. To-day we could say: "The pituitary makes men and women what they are."

After menstruation, the uterine mucous membrane remained quiescent for a day or two, and then began to grow thicker; the glands increased in size, and during the second half of the intermenstrual period began to secrete. In the ovary, maturation of an ovum was initiated as soon as a menstrual period ended, and ovulation occurred as a rule between the twelfth and fourteenth day of the menstrual cycle. The corpus luteum developed during the second half of the cycle, and degenerated before the onset of the next menstrual period, unless the ovum was fertilised; degeneration of the corpus luteum, and the termination of its function as an endocrine body, followed upon death of the ovum. The Graafian follicle produced a hormone which had been named severally folliculin, progynon, œstrin, and theelin; the corpus luteum produced luteohormone. Every month one of the primordial follicles in the ovary developed into a Graafian follicle; at the same time five or six other primordial follicles began to develop but failed to mature; instead they formed cystic atretic follicles, which secreted folliculin like the mature follicle.

Two or three days after the end of a menstrual period the folliculin secreted in the ovary stimulated the resting mucous membrane of the uterus by improving the blood-supply, and, as a result, the glands began to show signs of activity. When the Graafian follicle ruptured a corpus luteum was formed in the ovary and secreted luteohormone into the blood stream. Luteohormone consisted of two principles—hyperemmenin, which caused hyperæmia of the uterine mucous membrane, and progestin, which stimulated the development of the glands and prepared the mucous membrane for the reception of the ovum. These processes did not occur independently, but took place under the influence of hormones derived from the anterior lobe of the pituitary. The anterior lobe hormones were ossein, prolan A, and prolan B. Prolan A controlled the maturation of the Graafian follicles and the development of cystic atretic follicles, and prolan B governed the development of the corpus luteum.

Why, then, did menstrual bleeding occur? It followed upon death of the ovum and involution of the corpus luteum. As the corpus luteum degenerated the stimulus of luteohormone to the mucous membrane ceased. It was not, therefore, hyperæmia, as was formerly supposed, which provoked the menstrual flow, but the sudden onset of anæmia. The secretion of the glands digested the vessel walls and liberated the blood.

At one time chronic metritis was regarded as a common cause of pathological bleeding, but this condition was now known to be rare; it was usually a sequel of abortion or sepsis, and commonly fatal. The cases formerly grouped under this heading were now classed as cases of hæmorrhagic metropathia. In this condition the mucous membrane of the uterus was usually thickened—often enormously so—and so irregular as to appear polypoid; the muscle wall was hyperæmic. Most cases of hæmorrhagic metropathia were due to a superficial inflammation of the ovary, but a small number were due to pituitary conditions. Inflammation of the ovary acted as a stimulus and provoked the development of 50 to 100 primordial follicles at the same time; these active follicles all produced folliculin in the same way as the four or five cystic atretic follicles in the normal ovary. In consequence a lasting hyperæmia of the uterine mucosa was set up, and this continuous passive congestion ultimately injured the vessel walls and led to bleeding. In the small group of cases due to pituitary conditions the enlarged pituitary secreted an abundance of prolan A, which provoked uterine bleeding by its influence on the ovaries. Another example of bleeding due to endocrine action was to be seen in Graves's disease, where the abnormal thyroid secretion might provoke first spontaneous uterine bleeding and later amenorrhœa.

There remained various causes of uterine bleeding which were not endocrine in origin. Adenomyosis was a condition in which hyperplastic glandular tissue developed in the muscle of the uterus. In these cases, Prof. Frankl believed, bleeding was produced mechanically; the glandular tissue pressed on the vessels, and by inducing a continuous hyperæmia, eventually caused degeneration of the vessel wall and bleeding. Nor did he think that hæmorrhage due to myoma was endocrine in origin, although there was probably some relation between the development of fibroids and the endocrine system; bleeding, however, was probably produced mechanically by pressure on the vessels. Carcinoma, sarcoma, and tuberculosis of the uterus had no connexion with the ductless glands. Granulosa-cell tumours, occurring in the ovary, sometimes caused intense uterine hæmorrhage. These tumours arose from cell groups having the same histological origin as the lining of the Graafian follicles; they consisted of round or spindle cells surrounding lacunæ, which contained homogeneous material and had rather the appearance of ova. The resemblance to ovarian tissue was also functional, for these tumours produced folliculin and gave rise to a condition of the uterus identical with hæmorrhagic metropathia. Tumours of the thyroid might also provoke uterine bleeding through their endocrine action.

When the patient could afford it, hæmorrhagic metropathia might be treated by rest, and extract of ergot given hypodermically. Corpus luteum extracts had not fulfilled the hopes entertained for them. X ray treatment gave beneficial results, but the flushes, sweats, and tachycardia attendant on an artificially induced menopause were so much worse than the condition itself that he had abandoned this form of treatment. Poorer patients who were anxious to return to work should be treated by vaginal hysterectomy. In adenomyosis surgical treatment was again necessary. X rays and radium should be used for the treatment of myomata only when surgical treatment was refused. Carcinoma, sarcoma, and tuberculosis should be treated by operation whenever possible.

Mr. T. G. STEVENS said that there were a large number of cases in which bleeding appeared in multiparæ between the ages of 40 and 50. He had always taught that these were the result of chronic subinvolution. On microscopical examination the muscular coats of the smaller arteries were found to be replaced by elastic tissue, and he had always

considered that the bleeding was mechanical in origin, the arteries having lost their muscular control. He did not think that these cases could be explained on an endocrine basis.—Prof. FRANKL said that they could be regarded as a late result of hæmorrhagic metropathia. On examination a fine superficial oöphoritis was usually found in such cases; but the active stage—and, with it, the exaggerated production of hormone and the hyperæmia of the uterine mucosa—might have subsided before the patient came for treatment. He had found no increase in elastic tissue in the walls of the arteries, but had observed an increase of connective tissue. Subinvolution certainly existed but was not to be identified with fibrosis.

Dr. G. F. STEBBING was inclined to agree with Mr. Stevens that many cases of bleeding resulted from subinvolution. The patient usually had a history of abortion or complicated delivery followed later by hæmorrhage. The uterus was then found to be enlarged, and had the appearance of an organ which had suffered for years from passive congestion. Whatever view was taken of the cause, he shared Prof. Frankl's opinion on treatment, though he took a more favourable view of the value of radium and X ray therapy.

Dr. A. N. MACBETH, referring to the findings in hæmorrhagic metropathia, asked whether the "active follicles" mentioned by Prof. Frankl were all cystic atretic follicles without luteinisation.—Prof. FRANKL replied that normal Graafian follicles were also to be found. In reply to Dr. Stebbing he said that a certain number of cases of bleeding were due to subinvolution, but the importance of these must not be exaggerated, as cases due to hæmorrhagic metropathia were much more numerous.

In proposing a vote of thanks, Lady BARRETT said that when she was in Vienna in 1914 Prof. Frankl was already teaching that menstrual hæmorrhage was due to the digestive action of the glands and not to hyperæmia.—Dame LOUISE MCILROY, who seconded the vote of thanks, said that the teaching material at the Universitäts Frauenklinik was unequalled in this country.

ROYAL SOCIETY OF MEDICINE

SECTION OF MEDICINE

AT the meeting of this section, held on April 25th under the presidency of Dr. H. MORLEY FLETCHER, three short communications were read and discussed.

Dr. G. J. LANGLEY read a paper on

Bacteræmia in Pneumonia

based on a study of cases at the Hope Hospital, Manchester. He said that Procheska regarded pneumonia as a blood stream infection, comparable to enteric fever, with a local fixation in the lung at a later stage. This observer had obtained evidence of bacteræmia in all the 50 cases investigated by him, which showed a mortality of 24 per cent. The proportion of cases in which bacteræmia was found varied greatly with different observers, but all agreed that its presence rendered the prognosis much graver. Much work on this subject was done in America, where the mortality from the disease appeared to be about 30 per cent. higher than in this country, but even in New York there was a great difference in the mortality, according to the physician in charge and the particular hospital. Coloured people seemed to show a very low tolerance to the disease. Dr. Langley could not subscribe to the pessimistic view held by some that bacteræmia was a sign pointing to a fatal issue. The practice often followed of making a culture immediately on the patient's admission, and not repeating it unless the progress of the case was unsatisfactory or a positive result had been obtained, was of no help in showing what course bacteræmia might follow throughout the disease. In Dr. Langley's own series there had been some recoveries, whether the bacteræmia occurred early or late in the pneumonia. His patients ranged between 16 and 60 years of age. He believed that the disease in America was very similar to that seen in this country. In some cases organisms disappeared from the blood in the absence of any serum therapy; hence it was not justifiable to use the disappearance of bacteræmia as a criterion of the potency of a serum treatment. It was not possible to form a reliable opinion at the bedside whether bacteræmia was or was not present.

Prof. F. R. FRASER said that any guide as to when to give and when to abstain from giving serum treatment in cases of pneumonia must be of the greatest practical value. He gathered that Dr. Langley's studies had not yet enabled him to suggest any working rule on this matter. No standard method existed of ascertaining whether or not bacteræmia was present. It was probable, however, that the complication when it occurred early in the pneumonia had not the same evil significance as when it occurred at a later stage, for in the former case it might represent a natural order of occurrence, whereas when appearing later it might indicate a breaking down of the resistance agencies of the body. In answer to a question by the President, Dr. Langley said that he had not found leucocytosis in association with the bacteræmia. One or two of his patients had had ulcerative endocarditis, apparently arising from the pneumonia itself.

Dr. REGINALD HILTON read a contribution on

The Action of Artificial Pneumothorax on the Lung Lymphatics

He described an investigation which was still in progress into the working of the lymphatics of the lung, as shown by the removal of carbon particles from a collapsed lung as contrasted with their removal from a healthily functioning normal lung. In the 12 animals investigated a difference in the behaviour of the collapsed and the uncollapsed lung was noticeable. The pigment was retained to some extent on both sides, but in every case the collapsed lung showed a far greater quantity of carbon, chiefly gathered round the vessels. In the collapsed lung this picture was seen even four months after the injection, and the lymphatics were grossly dilated. Collapsed lungs collected from human subjects showed a similar dilatation of the lymphatics, also some fibrosis. Hence in both the experimental rabbits and in human subjects there must exist, in the collapsed lung, some hindrance to the lymphatic flow. Dr. Hilton suggested that this mechanism might play a large part in the observed clinical action of therapeutically induced pneumothorax. In the first place this lymphatic stasis might lessen the mobilisation and absorption of tubercle bacilli, and so lessen the spread in the patient of his tuberculosis; and possibly also there might be a reduced absorption of the products of the tubercle bacillus. If these surmises were correct, they afforded an explanation of the striking effect on the temperature and general condition sometimes noted in febrile patients within a short time of the beginning of

artificial pneumothorax treatment before there had been time for any beneficial action on the healing process itself. Some believed that the benefit derived from the induction of pneumothorax was in direct proportion to the degree of the lung collapse.

Dr. LEONARD FINDLAY submitted, as a result of somewhat similar experiments in carbonisation of lungs in animals which he had carried out years ago, that much of the carbon was eliminated by healthy lungs in the simple process of expectoration, just as a foreign body in the pulmonary tree was got rid of in many cases. In this process the collapsed lung was naturally very deficient. The locking-up of the carbon was largely due to what was practically a paralysis of the respiration on the collapsed side.

Dr. H. LETHEBY TIDY said some time ago it had been shown that inhaled particles of foreign substance, such as carbon, entered the lymphatics and were carried by them to the glands, and hence, in some cases, were spread to the rest of the body. He thought that both Dr. Hilton and Dr. Findlay had put forward rational explanations.

Prof. HALL commented on the relation of this subject to silicosis; many of the problems in that disease turned upon the facility of elimination of silicotic and other foreign material. He agreed that elimination was largely carried on by the ordinary activity of the air passages.

Dr. HILTON, in reply, said that the miner continued to spit up black material a long time after he had left his work; in his microscopic preparations black material could be seen entering the phagocytes in what seemed a very leisurely fashion. He hoped in future to work with acid-fast bacilli, and to see the mechanism of their elimination.

Prof. A. J. HALL read a paper on

Whooping-cough in Old Age

He said that though whooping-cough was more restricted to the first five years of life than were most of the specific fevers, it could occur at any age, and a large number of well-authenticated cases had been recorded in people over 60 years. Elliotson had referred to an archbishop who had the disease shortly before he died at 75 years of age; Sir William Jenner had it when he was over 65; while Hale-White had recorded a case in a woman of 81 who had no signs of bronchitis. It seemed that as the child grew older a natural immunity was developed; this did not, however, suffice to afford protection later in life. Some of the cases attacked in old age were known to have had whooping-cough in childhood; in others no definite information on this point could be obtained. Those who developed whooping-cough in old age had either never been made immune or the immunity had disappeared with the years. He related in detail the case of an observant medical man who had the disease when more than 70 years old, after 40 years' work which included treatment of a large number of patients with whooping-cough. So violent was his coughing that he ruptured an abdominal muscle; the condition became distressing; and after the abdomen had been strapped, fits of coughing were followed by fibrillary twitching of the abdominal muscles, which went into a condition of spasm. The patient slept very little, and always in a chair. The attack ended after the ejection of a small pellet of mucoid sputum. The patient had always prescribed adrenaline for whooping-cough in his practice; and when at length he had been convinced of the diagnosis, he asked to be treated with adrenaline. For two hours it seemed to relieve him, but the paroxysms of coughing then returned with equal force. It was very important, Prof. Hall said, that the occurrence of these adult cases should be recognised, because there existed a widespread view that old age was exempt from the disease, with the result that its victim might spread infection among unsuspecting people. It appeared that in respect of whooping-cough, as of broncho-pneumonia, old persons reverted to early childhood.

Dr. J. D. ROLLESTON said he had not had any experience of whooping-cough in old age, but had seen a nurse aged 21 suffering from it, and a woman of 50. In France, Boyer had observed cases ranging in age from 60 to 92 years.

Dr. J. R. BLACKBURNE said whooping-cough was essentially a children's disease, and if the parents had not had it, they could catch it from their children. It was difficult for him to understand an immunity due to growth and development. In two old cases under his care there was a definite whoop, and he had no difficulty in making the diagnosis. No vomiting occurred, and the old people were not as ill as might have been expected. One died of cerebral hæmorrhage two years after the whooping-cough; it was a wonder she did not die of this during her severe paroxysms of coughing.

The PRESIDENT referred to a case in a man aged 80, who was sent by a doctor to hospital with a note stating that he probably had a mediastinal growth or an aneurysm. No chest signs were detected, but he had a paroxysm of coughing while in the department, so severe that he seemed likely to die, and it was followed by extreme cyanosis. The President made a tentative diagnosis of whooping-cough, which had turned out to be correct. Some people seemed never to acquire immunity. To his knowledge a nurse, now 31 years of age, had had whooping-cough twice and mumps twice.

Dr. LETHEBY TIDY said that Prof. Hall had pointed out to him that the recommendation of adrenaline for whooping-cough in Dr. Tidy's book was not to be found in any other English book on medicine. Dr. Tidy added that it had been his practice for many years not to reserve its use for the time of the actual spasm, but to give injections regularly thrice daily. After an influenza outbreak in 1922 there had occurred many cases of whooping-cough.

Dr. MAURICE DAVIDSON mentioned the case of a woman about 60 years of age who contracted whooping-cough from a grandchild. He was asked to see her three weeks after the onset, as her evening temperature was mounting to 103° and 104° F. for no obvious cause. A blood culture was carried out and *Streptococcus viridans* was grown after ten days. She made a good recovery, without specific treatment.

Dr. FINDLAY thought it difficult to generalise about immunity; a person might be exposed to infection over and over again without catching the disease and then catch it. Some metabolic change must be involved as well as exposure to the actual virus. He still thought that whooping-cough must be a rare disease in old age.

Prof. HALL, in reply, said that physicians must be prepared to meet with typical and very severe cases in old people.

EXTENSIONS OF SMALL HOSPITALS.—Tamworth Hospital has been enlarged by the addition of a theatre equipped on modern lines and other accommodation.—Maternity wards, including pay beds, have been added to Towyn War Memorial Cottage Hospital at a cost exceeding £2000 as a help to reducing the maternal mortality-rate in Merionethshire. The hospital meets the needs of Towyn, Aberdovey, and six surrounding villages.

REVIEWS AND NOTICES OF BOOKS

Diseases of the Heart

By Sir THOMAS LEWIS, C.B.E., F.R.S., M.D., F.R.C.P. London: Macmillan and Co., Ltd. 1933. Pp. 297. 12*s.* 6*d.*

To the many who have wished in vain for an opportunity to hear Sir Thomas Lewis teach, this book will be welcome. They will be wise in approaching it with a clear understanding of its purpose, which is set out in the preface. Sir Thomas Lewis has not attempted to provide an exhaustive treatise on heart disease, or a book of reference, or a monograph designed to throw light on obscure conditions. The intention has been to place at the disposal of students and medical practitioners an outline of the clinical teaching on diseases of the heart which has up to now been the exclusive privilege of University College Hospital students. The subject matter is based on personal observation; only those facts are set out which the author himself has proved to be true, and the information is presented with a simplicity and economy of detail, the value of which will be appreciated by those who have found little help from more wordy explanations. Of the 30 chapters, 11 are devoted to morbid physiology, 3 to valvular "disease," and 9 to the various ætiological types of heart disease. Those who have not the time to read large volumes will be glad to find a short but adequate description of pallor, cyanosis, and cutaneous blood flow, subjects to which Sir Thomas has made many original contributions. In dealing with the effort syndrome Sir Thomas gives an admirable summary of his previous work on the "soldier's heart." This section might, indeed, have been expanded with advantage, since the syndrome, generally masquerading under the guise of heart disease, confronts the general practitioner so often that it is essential for him to be able to recognise it and to realise its significance.

Like Sir Thomas Lewis's other books, this one is essentially stimulating. It contains the considered opinions of one who has thought deeply on many aspects of the subject, and the only general criticisms that might be made are that, in a work intended for practitioners and students, the detail is in a few places too intricate, and that conditions are included which are relatively unimportant. In discussing the diagnostic significance of fever and splenic enlargement in bacterial endocarditis it is said that "when heart disease is complicated by malaria, active rheumatism, typhoid fever, or Malta fever, this same combination of signs may appear." So far as general practice in Great Britain is concerned, complications of heart disease with these infective conditions, excepting active rheumatism, must be rarely met.

A faithful disciple of Mackenzie, Sir Thomas repeatedly emphasises the supreme importance of heart failure, and points out how often it is difficult to arrive at a satisfactory anatomical diagnosis. He says: "Angina pectoris and cardiac failure are clinical states. . . . It is in these terms that diagnosis must usually be made. . . . Angina pectoris and cardiac failure never can find equivalents in the terms of structure." It must be admitted that, in the present state of our ignorance, this is often true, but it would be unfortunate if this teaching were interpreted as condoning the abandonment of any attempt to ascertain the underlying cause of disease in each case.

To the newly qualified the section on prognosis will be a helpful guide and senior men will be glad to have their impressions confirmed or corrected by the results of Sir Thomas Lewis's great experience. An unusual feature of this book—the four pages entitled "Conversing with the patient and his friends"—will appeal particularly to those who find it difficult to translate technical conceptions into language acceptable to the layman and not unduly alarming.

Two helpful diets are set out at the end of the book, one for use in grave congestion, the other for patients who, during convalescence, are not taking exercise.

Piersol's Normal Histology

With special reference to the Structure of the Human Body. Fifteenth edition. Edited by WILLIAM H. F. ADDISON, B.A., M.D., Professor of Normal Histology and Embryology in the University of Pennsylvania. London: J. B. Lippincott Company. 1932. Pp. 478. 25*s.*

Bailey's Text-book of Histology

Eighth edition. Revised and rewritten by ADOLPH ELWYN, A.M., Assistant Professor of Neurology; and OLIVER S. STRONG, A.M., Ph.D., Professor of Neurology, College of Physicians and Surgeons, Columbia University. London: Baillière, Tindall and Cox. 1932. Pp. 746. 31*s.* 6*d.*

BOTH of these text-books have established a firm position in students' libraries. Through the refining processes of repeated editions they have acquired both finish and soundness of substance. Prof. Addison's book has the great merit, from the point of view of the medical student, that it aims at using normal human tissues as a basis for the study of pathological histology; we have, in the past, been served too often with portions of cat, dog, and any other convenient animal for this purpose. The arrangement of the different sections follows conventional lines; they are well and profusely illustrated though all of the coloured plates do not achieve the same high standard. The illustration of the pituitary gland on page 227 is certainly not that of a normal human gland; if it represents that of some other animal this should surely be specified. It is odd, too, to find that hæmolymph glands are still described as a variety of human lymphadenoid tissue, although in our experience and that of many others they are not found at autopsies. The volume is brought up to date with a series of appendices dealing with tissue culture, the microdissection of cells, supravital staining, and the reticulo-endothelial system. A section is devoted to technical methods and a comprehensive bibliography is appended.

Profs. Elwyn and Strong for this edition of Bailey's Text-book of Histology have enjoyed the collaboration of Dr. P. E. Smith (respiratory system and endocrine glands); Dr. W. M. Copenhaver (lymphoid organs and glands); Drs. A. E. Severinghaus and R. L. Carpenter (digestive system); and Dr. C. M. Goss (the living cell). The result is a vital and in some respects an unorthodox text-book. Considerable space is devoted to the living cell, to its structure, physiology, and methods of studying its habits. In including cinematography the authors have obviously been alive to the desirability of correlating structure and function; in many places the description of the histology of an organ is followed by a paragraph on its functions. The whole text has now been brought up to date by rewriting it instead of dove-tailing new bits into the old. The illustrations are lavish

and excellent; the drawings of specimens and models of organs in three dimensions are particularly instructive, especially in respect of such difficult structures as the liver. We note that in this work the existence of hæmolymph glands in man is regarded as very doubtful. In the section on the neuroglia the methods of Golgi are properly superseded by those of Cajal and Hortega. This is a readable and attractive handbook.

Aids to Materia Medica

By G. H. NEWNS, M.B., B.S., M.R.C.P. Lond. London: Baillière, Tindall and Cox. 1933. Pp. 141. 3s. 6d.

THIS book is intended to assist medical students reading for materia medica and pharmacology examinations, and is based throughout on the British Pharmacopœia, 1932. An introductory section consists of brief notes on the active principles of drugs, modes of administration, prescribing, incompatibility, and idiosyncrasies. The main part of the book consists of short articles on the principal drugs, containing notes on their composition, doses, actions, and pharmacopœial preparations. The concluding section consists of tables showing the doses and strengths of drugs and their preparations, and other tables of drugs grouped according to their pharmacological and therapeutic actions. Materia medica is a subject not easy to compress into a series of concise statements; the articles have a scrappy appearance, and some of them are so condensed as to be of no great value. The tables of doses and strengths will doubtless be useful for rapid revision immediately prior to an examination, and the student who has attended a good series of lectures and has read advanced text-books on materia medica and pharmacology may be helped to recall the essential facts by study of this little book.

Les abcès du poumon

By MICHEL LÉON-KINDBERG, Médecin des Hôpitaux de Paris; and ROBERT MONOD, Chirurgien des Hôpitaux. With the collaboration of A. SOULAS, Assistant d'oto-rhino-laryngologie à l'Hôpital Laennec. Paris: Masson et Cie. 1932. Pp. 322. Fr.55.

IN recent years there has been an apparent increase in the incidence of disease associated with pulmonary suppuration. No doubt this is partly accounted for by the more accurate methods of diagnosis now available and especially by the routine employment of X rays. To the indirect evidence of pulmonary disease supplied by radiology we can also now add the direct evidence of bronchoscopic inspection. Two factors may, however, have determined an actual increase in the number of sufferers from pulmonary abscess—the increased popularity of tonsillectomy, and the recent epidemics of influenza, a disease which is notoriously liable to pulmonary complications. It must be admitted, however, that a considerable proportion of pulmonary abscesses cannot be attributed to either of these causes. But whatever the cause, the urgency of the need for prompt and effective treatment of pulmonary suppuration is obvious, and the appearance of this excellent monograph is opportune. Drs. Léon-Kindberg and Robert Monod write with authority, and we recommend their study not only to those who are specially interested in chest diseases but also to the general practitioner upon whom a special responsibility rests. For it is he who sees the first stages of a process which if allowed to develop will end in disaster. It is true that many abscesses heal spontaneously. If the pus establishes communication with a bronchus satisfactory drainage may be secured by natural passages; but if no manifest improvement is noted within a period of about three weeks from the onset, palliative and expectant treatment must be abandoned for bronchoscopic drainage which may secure the evacuation that nature has failed to effect and obviate the need for operation. How effective this method may be in the treatment of certain forms of pulmonary abscess has been shown by recent work in this country, and notably by the results obtained at the Victoria Park Chest Hospital (*Tubercle*, 1932, xiii., 529), but bronchoscopic methods cannot be expected to cure disease of old standing, and Dr. Léon-Kindberg maintains, however, that an abscess which persists for three months cannot be expected to heal by conservative treatment. It is at this stage that operation must be considered, whether a simple lobotomy and drainage, or the more serious operation of lobectomy, partial or complete. The necessity of securing pleural adherence before cutting into pulmonary tissue teeming with micro-organisms, and the grave danger of empyema when this precaution is neglected, is still, perhaps, insufficiently realised, and the authors rightly emphasise the need for securing pleural occlusion before opening up septic areas in the lung fields. The indications and contra-indications for the various types of operation are fully discussed, and a chapter is devoted to a brief survey of the various procedures that have been adopted to eradicate septic areas, and an outline of the technique which has been proved to yield the most satisfactory results. The numerous reproductions of skiagrams which illustrate the text add to the value of a work which demands and will repay careful study.

Favourite Prescriptions

Third edition. By ESPINE WARD, M.D. Belf., late West African Medical Staff; Fellow Royal Society Tropical Medicine and Hygiene. London: J. and A. Churchill. 1933. Pp. 148. 7s. 6d.

THE contents of this volume are tables showing the appropriate dosage for age and the approximate equivalents of certain weights and measures in the imperial and metric systems; regulations regarding the prescribing of drugs scheduled in the Dangerous Drugs Act; the principal changes in the official titles and strengths of drugs in the British Pharmacopœia, 1932; a list of official preparations with their doses; some hints on the treatment of poisoning; and a host of prescriptions for all sorts of diseases, many of them taken from various standard text-books of medicine and therapeutics, with such modifications as the author has found of value. A new feature is the diet tables indicating in a general way the foodstuffs and drinks allowed and forbidden in a number of conditions. It is to be doubted whether there is much wisdom in laying down diets for symptoms like dyspepsia and anæmia, which may be due to many different causes. A book of this sort may serve to refresh the memory of a physician who attempts to treat disease on a rational basis and has made his plan for doing so before consulting it. For this purpose it will be found a convenient handbook.

THE Handbook of Experimental Pathology (Baillière, Tindall and Cox, 1933, pp. 160, 23s.), referred to in a leading article on page 867 of THE LANCET last week, is by Dr. George Wagoner and Dr. R. Philip Custner.

THE LANCET

LONDON: SATURDAY, APRIL 29, 1933

FUNCTIONAL DISORDERS OF THE GALL-BLADDER

A GREAT deal has been written about the gall-bladder, and many confusing views have been put forward to explain its behaviour in health and disease. We need, therefore, a review of what is now known of the physiology of this important organ, and it is admirably supplied by Dr. CHARLES NEWMAN in his Goulstonian lectures, the third of which appears in our present issue.

After discussing in some detail the concentrating function of the gall-bladder and the way in which it fills and empties, he considers the nervous and pharmacological stimuli which influence its motor functions, and refers to the recent work on the hormone cholecystokinin. From the clinical point of view, perhaps, his most important contribution is on the subject of biliary dyskinesia. Much work has been done on the functional disorders of motility of the extrahepatic biliary system, mainly abroad, and Dr. NEWMAN'S second lecture is invaluable in putting before clinicians in this country the first clear and concise account of these interesting departures from the normal. He describes two fundamental types of biliary dyskinesia, the spastic and the atonic, but points out that their division into hard-and-fast entities is artificial, in that the individual case may show different degrees of departure from the normal at different times. Generally speaking, however, the spastic type is seen in patients, more commonly women, who are heavily built, though not fat, are of an average age of 35, and have a wide costal angle and broad shoulders. They are usually active mentally, athletic, and "overstrung." The chief symptom is a dull grinding pain, intermittent and colicky, radiating through to the back and followed by soreness. The pain comes on after exposure to cold, when tired, or some two hours after a meal, and often wakes the patient at night. It is sometimes relieved by food. The attacks are accompanied by nausea; the patient loses weight, has a poor appetite, and often shows extrasystoles. There is sometimes a history of transient jaundice. In the absence of any organic lesion—careful exclusion is of course essential, since much the same symptoms may appear in cholecystitis—these cases are explicable on the basis of over-action of the vagus, emptying of the gall-bladder and bile-ducts being prevented by over-action of the muscle of the ampulla. The treatment based on this hypothesis is by diet and medicine. The diet consists of small, equal, and regular meals, the avoidance of mixtures of fats and carbohydrates, and restraint in the use of irritating foods; the essential medical remedy is belladonna, and Dr. NEWMAN states that treatment on these lines is highly satisfactory. The second main type of biliary dyskinesia is atonic distension. This occurs in older people and in a different constitutional type. The patients are slim in build, with narrow costal angles, sloping shoulders, and a poor musculature. Their symptoms are a continuous pain of heavy aching character coming on soon after meals, with the region of the gall-bladder as the seat of maximum discomfort. The pain does not radiate through to the back, and there is flatulence, constipation, and occasional vomiting, but very little nausea. Achlorhydria is common, and the stomach is atonic with a delayed emptying-time. For this type of case treatment is apparently unsatisfactory and must be directed mainly to dealing with the achlorhydria and the gastro-intestinal atony.

Whether these functional abnormalities are best explained in terms of nervous over-action or under-action, or whether they represent further examples of constitutional predisposition or diathesis, is not yet clear. The latter explanation seems the more probable seeing that the sthenic and asthenic types in their relation to gastro-intestinal disorders correspond closely to the description Dr. NEWMAN gives of the subjects of biliary dyskinesia. Much work remains to be done before these cases can be generally recognised, and it must be understood that they can form but a small proportion of biliary disorders. Nevertheless their description is of great value in providing a reasonable explanation of gall-bladder pain without structural change, or of symptoms persisting after cholecystectomy, with which all surgeons are familiar, and which have hitherto been attributed to such unsatisfactory causes as adhesions or inspissated bile. Dr. NEWMAN'S work should help to stimulate closer study of cases of biliary disorder and to emphasise the ultimate value to the patient of a proper understanding of his physiology by those responsible for his treatment. On the scientific front the points where medicine and surgery join one another are often the points where greatest advance is possible; and these Goulstonian lectures teach once more the lesson that the medical and surgical troops should be able to keep one another's operations in view.

MENTAL DEFECTIVES IN LONDON AND ELSEWHERE

MUCH is heard nowadays in the lay press and on the platform concerning the burden imposed on the community by mental disability. The signatories to the Ray report expressed themselves strongly on the increasing volume of expenditure for which they could see little useful return and urged that rigid economy should be exercised in this direction. Even more alarmist statements as to the rate of multiplication of the insane and defectives have become a commonplace of sociological propaganda and in the heat of ensuing controversy the facts tend to be lost sight of. It is salutary to turn to a prosaic document[1]

[1] Annual Report of the London County Council, 1931, vol. vi.: Mental Hospitals and Mental Deficiency. London: P. S. King and Son. Pp. 54. 1s.

which presents a comprehensive record of those who come under public care on account of mental disability in a very large area where the Mental Deficiency Acts have been energetically carried out since their inception. The mental hospitals committee of the London County Council reports that in 1931 there were 14,085 ascertained defectives in the County of London. This figure does not include children in the Council's special schools, nor a number of poor-law cases in institutions recently transferred under the Local Government Act, 1929, which have yet to be combed out. The total represents a ratio of 3·23 per thousand of the population as against an estimate of 8 per thousand (which however also included special school children) made by the Wood Committee. As the report under discussion, together with other reports issued by the various departments of the Council, indicates a close liaison with the poor-law, the education service, the police and prison authorities, and social agencies, it is unlikely that many defectives are being missed. The number of new cases notified to the Council during the year reached the large total of 2053, an increase of 83 per cent. over 1929, but practically the whole of this increase was due to the operation of the Local Government Act which transferred to the care of the mental deficiency committee a large number of patients hitherto maintained under the old poor-law régime. No less than 637 of the new cases notified in 1931 were already inmates of mental institutions of one sort or another; 605 young people were notified by the education authorities, mostly for preventive supervision and care in their own homes. This latter figure has also been augmented of recent years by an amendment of the Mental Deficiency Acts which represents a change in policy rather than a real increase in numbers.

An instructive table on p. 49 gives an analysis of the type of person dealt with under the Acts, but of 1879 new cases notified and investigated during the year, 1098 proved to be "high grade and tractable." Of these patients 616 were recommended for institutional care, with a hope that the discipline and vocational training would enable a considerable proportion of them ultimately to maintain themselves. About 400 were left under supervision in their own homes or placed under guardianship. Over 500 proved to be an inevitable charge on public funds owing to lowness of mental grade or concomitant blindness, deafness, or epilepsy. In view of the grave charges made against mental defectives as a social menace, it is noteworthy that although the London magistrates and prison authorities are keenly interested in the Mental Deficiency Act only 94 notifications of alleged defectives were received from the London police-courts or prisons during the year and of these only 55 proved to be certifiable. The offences with which most of these prisoners were charged were trivial. Routine surveys of the London casual wards revealed only 8 certifiable inmates during the whole year. Further, of the defectives ascertained in 1931, 5 were leading immoral lives, 17 had borne illegitimate children, and only 3 were married (the number of children being unfortunately not stated). There is little evidence here to support the allegation that the defective population is a social danger or is propagating itself at an alarming rate.

The London County Council has at its disposal sufficient institutions to provide for a proper classification of patients and adequate training for the higher grade cases whom it is possible to stabilise and return to the community. Approximately 3000 London patients are maintained in institutions directly under the Council, and 344 in small voluntary homes selected for religious or other special reasons. Over 300 patients are out on licence and 146 cases are under statutory guardianship. A provision to which great value is attached is the placing under statutory supervision in their own homes; 3021 patients (1412 males and 1609 females), mainly children or young adults, are thus ensured care and guidance at a negligible cost to the community and with a minimum disturbance of liberty. For some defectives the best supervision is completely inadequate as a means of control and institutional care is required. On any evidence of neglect or anti-social conduct the visitors make their reports, and suitable action can be taken before harm is done. This work, in which the London Association for Mental Welfare was the pioneer and for years rendered invaluable service, has now been undertaken by the Council itself and the London Association has ceased to exist. In view of the high cost of institutional accommodation, the method of supervision of suitable cases may well be extended to other areas where it is at present little used. In the institutions themselves maintenance costs might be reduced, as Dr. H. FRIEZE STEPHENS has pointed out,[1] by standardising supplies and systematic central purchasing by the local authority, following the example of London where Dr. W. B. KNOBEL has been largely responsible for the system of purposive economy. Moreover, by combining the experience of its several institutions, each local authority would be in a position to determine the numbers and types of article really necessary and so to simplify purchase in its area as a whole. The general adoption by local authorities of the standards determined by the British Standards Institute would enable statements of comparative costs for their several areas to be effected more easily and usefully. Staffs too might be unified so that officers of every kind would all be members of the nursing staff, the more menial work being done by the patients themselves. Some useful lessons may be learned from the Gheel Colony in Belgium, described by Miss S. CLEMENT BROWN in the same journal, where the community care of mental defectives has been going on for at least seven centuries. Originally a religious charity, it is now the property of the State and available for rate-aided and private patients from all over the country. The village exists for the colony and all its inhabitants accept part of the responsibility

[1] Mental Welfare, Jan. 15th.

as their own; the patients do exactly what they like in the village and no one seems to mind. The colony stands as a demonstration of the effectiveness of slow unconscious growth in social situations where studied imposed plans often seem to present insuperable difficulties. The chairman of the Board of Control has cited [3] similar conditions in a colony near Bourges, where many of the 1100 patients are free to do what they like, provided they come in to meals; and suggested the same kind of experiment here.

SERUM SICKNESS

SPECIFIC antitoxic or antibacterial sera, usually derived from the horse, are employed in the prophylaxis or treatment of an increasing number of acute infective processes. The parenteral introduction of foreign proteins contained in animal serum is liable to give rise to unpleasant phenomena which range in severity from alarming and possibly fatal anaphylactic shock to the syndrome known as serum sickness or the serum disease, the main feature of which is a more or less generalised urticarial eruption. Generally speaking, as J. D. ROLLESTON showed many years ago (1905), the frequency and intensity of rashes and other serum phenomena are in direct relation to the size of the dose. Hence it is important to reduce the size of the dose in terms of foreign proteins. This has been accomplished in an increasing number of antisera by a process of refinement or concentration as the result of which almost all the proteins are removed leaving only the globulins to which the antitoxic or antibacterial principles adhere. The general experience is that both the incidence and severity of serum reactions are notably diminished when these concentrated products are used, as they always should be when available.

L. N. CLAIBORN [4] divides serum reactions into immediate (within 24 hours), accelerated (later than 24 hours but within 5 days), and ordinary (from the fifth day onwards). Immediate reactions—which are the most important, since they are likely to be by far the most severe—tend to appear in those who have been sensitised by a previous dose of serum of the same species injected more than a week previously, or in those who have a personal or family history of asthma and are thus actual or potential allergics. There is no doubt that large numbers in both these classes have been unwittingly injected with serum without special precautions and without untoward results; on the other hand, alarming and sometimes fatal acute anaphylactic shock has followed the injection of a fraction of a cubic centimetre of horse serum into natural hypersensitives who have never been injected before but who have frequently, though not always, had a personal or family history of asthma. If there is reason to suspect sensitivity its existence may be elicited by the prior introduction of a very small amount of the serum. If intravenous therapy is intended, the test for sensitivity must be made intravenously. Otherwise 0·05 to 0·1 c.cm. of serum is diluted 1 in 10 with normal saline and injected intradermally. The local production of a weal within 15 to 20 minutes indicates sensitivity. CLAIBORN prefers to instil one drop of undiluted serum into the conjunctival sac, as suggested by S. SPICER, because although less sensitive than the intradermal test she considers it of greater clinical value. If sensitivity is shown an attempt must be made to desensitise the patient by injecting intravenously or intramuscularly a further small amount of diluted serum. Absence of symptoms is presumed to indicate desensitisation, and the therapeutic dose may follow in an hour's time. But, as Dr. DAVID HARLEY pointed out in our columns on April 1st, desensitisation is difficult, and severe reactions and even fatalities have occurred in supposedly desensitised cases. To overcome the difficulty of serum therapy in the case of the sensitive it has been proposed to use immune serum from animals other than the horse. R. KRAUS [5] advocated the use of bovine serum as much less likely to produce reactions; and from his study of the local skin reactions produced in allergics by the intradermal injection of various animal sera HARLEY supports this recommendation. If desensitisation has clearly not been effected, and failing a supply of bovine or goat serum, the only way safely to administer a therapeutic dose in the persistently sensitive is to introduce it fractionally at intervals.

In serum therapy the intravenous route is increasingly employed, and in some conditions is essential if the best, or indeed any, therapeutic results are to be obtained. This is notably the case in the treatment of toxic diphtheria, and of lobar pneumonia by Felton's serum. There are more likely to be, however, immediate reactions, even in normal persons, with intravenous injections, and it follows that this route should only be adopted when there is evident clinical necessity. Adults are more likely to suffer reactions than children. Dr. W. T. BENSON and Dr. A. L. K. RANKIN, discussing in our last issue the treatment of puerperal septicæmia with antitoxic serum, state that its intravenous injection occasionally causes severe immediate distress, and is followed in at least 20 per cent. of cases by serum sickness. In a series of 26 cases of lobar pneumonia injected intravenously with Felton concentrate, R. R. ARMSTRONG and R. S. JOHNSON [6] found, on the contrary, that there was little sign of anaphylactic shock. It occurred in two cases only, and was promptly relieved by adrenaline. Students used to be taught by a famous obstetrician always to tie a catheter to the midwifery forceps to remind them of the necessity of emptying the bladder before applying the forceps. Similarly the practitioner may be advised to tie an ampoule of 1 in 1000 adrenaline solution to the antitoxin syringe—so essential is it to have this remedy at hand for the prompt alleviation of untoward symptoms. BENSON and RANKIN always injected adrenaline

[3] Report of a Conference held at B.M.A. House, Dec. 1st, 1932. Cent. Assoc. for Mental Welfare, 24, Buckingham Palace-road, London, S.W.1. Pp. 175. 3s. 6d.
[4] Jour. Amer. Med. Assoc., 1932, xcviii., 1718.
[5] Münch. med. Woch., 1922, lxix., 204, 1566.
[6] Ann. Rep. Med. Off. London County Council, 1930, vol. iv., Part III., p. 143.

with the serum, and this is a sound plan. By whatever route, serum must never be injected cold but always at body temperature. Many prefer to dilute the serum with warm sterile normal saline or glucose saline, and there is some evidence that the simultaneous introduction of glucose diminishes the liability to reactions. Finally, injection, especially into a vein, must be slow; and this is sometimes ensured by substituting a funnel and tube for the syringe and allowing the warm diluted serum to flow by gravity into the vein. The slight risks of troublesome reactions attendant upon intravenous serum therapy are far outweighed by the superior clinical results, but it should never be resorted to lightly.

THE NEW CARDIOLOGY

IF one were to picture cardiologists divided into groups like politicians, with the pure scientists forming the extreme left and the pure clinicians the extreme right wing, Sir THOMAS LEWIS might be found on the front bench of the left centre party. He looks at heart disease from rather a different angle from that of most clinicians. But it is only by viewing things from new angles that progress is made, and we welcome the appearance of a book, reviewed on another page, in which his teaching is summarised. One could imagine this work being epitomised in American phrase as the "reaction" of a man of science to clinical problems. It is more than that, for though Sir THOMAS LEWIS may have the critical outlook of the experimental scientist, his work illustrates that interest in the development and course of disease is by no means incompatible with interest in the patient's welfare and progress. He ranks, however, as one of the ablest critics of his day, and in none of his previous works has his critical faculty had greater scope. He exposes, with logical and forceful argument, the fallacy of many beliefs which have been handed down from generation to generation. Had medicine not claimed his services, Sir THOMAS LEWIS might well have made a reputation at the Bar. One can imagine him bringing about the discomfiture of some unfortunate witness who was vainly attempting to uphold the hypothesis of back pressure on the basis of "an intangible valvular defect, draped with complex but unproved hypothesis." One can visualise his righteous wrath when confronted by a criminal accused of being an accessory to the theory of "compensation." When a "plain observation is garnished with an assumption and served up in an unrecognisable form," a heavy sentence would obviously be asked for, since he protests against the prevalence of this pernicious habit. A number of outwardly respectable clinicians who read this book will know themselves to have been guilty of this crime. Some will be prepared to put up a spirited defence, having observed the depressing effect of a guarded agnosticism on the patient's friends. They may even argue that confidence in the reliability of such clinical methods of investigation as are available is essential, and that if one interpretation is discredited it is necessary quickly to invent another, before confidence is irretrievably lost. But beneath an unruffled surface the seed of a more scientific conception of medicine will have taken root, and Sir THOMAS LEWIS will not have laboured in vain.

ANNOTATIONS

LIVERPOOL AND THE PREVENTION OF CRUELTY TO CHILDREN

ON April 19th, 1883, a town's meeting was held in the Town Hall, Liverpool, as a result of a suggestion made by Mr. Samuel Smith, one of the Members of Parliament for that city, at the annual gathering of the S.P.C.A., that children also needed protection from cruelty. From this meeting arose the Liverpool Society for the Prevention of Cruelty to Children which has just celebrated its jubilee. The report issued for the occasion gives a deeply interesting summary of the society's birth and work. It could not have been flattering to the pride of a great city that the condition of its children was such as to call for the intervention of a society to protect them from active cruelty; yet the presence on the streets of ragged, shoeless, verminous, and starved children was enough to arrest the attention and excite the wonder of all who had not become used to it. The society strove to achieve its end not by punitive measures, but by persuasion and reasoning with those guilty of cruelty, with a view to awaken a sense of parental responsibility; and the first chairman, Mr. F. A. Agnew, and the kindred spirits associated with him, displayed inexhaustible patience in following out these aims. The work of the society made a profound impression, and other towns copied the Liverpool system. The London society was founded in 1884, and the movement soon became national leading up to the Acts of 1889 and 1894. The report makes mention that after years of experience it was estimated that 90 per cent. of the cruelty brought to the notice of the Liverpool society was due to intemperance on the part of parents who, generally speaking, otherwise took good care of their children. Shortly before this expression of opinion Dr. E. W. Hope had, as medical officer of health to the city, advised the city council that unless and until measures were taken to diminish the evil of intemperance it would prove an insuperable obstacle in further sanitary progress. After bitter controversy the council caused large areas to be placarded with posters showing the evils of intemperance; their effect on those appealed to may have been small, but the ultimate results, from stimulation of much-needed legislation and in other ways, were by no means small. In other directions, too, important developments were built up on the foundations laid by the society. In 1902 Dr. Hope had some conversation with Mr. W. Rathbone about the feasibility of employing suitable women to visit the homes from whence the neglected children came and advise the occupants on domestic cleanliness, care of children, and so forth. The work of the district nursing association had then already proved the value of the presence of trained women, even in the most wretched homes. Mr. Rathbone humorously retorted that what they

wanted was 10,000 charwomen to clean up the homes. The health committee, however, proved sympathetic to the suggestion, and the first person employed in the capacity of what is now known as "health visitor" was Miss Radcliffe, the trusted helper of the S.P.C.C., whose success in that capacity led shortly to the appointment of other women. Yet another effort—the Police-Aided Clothing Association—grew out of and supplemented the work of the society; this association has for its object the provision of clothing for indigent children, the aid of the police being available to prevent the articles provided being pawned by the parents; and it may not unfairly be regarded as the forerunner of the Child Welfare Association which has had so fruitful a career in Liverpool under the inspiring leadership of Miss Margaret Beavan.

CRANIAL NERVE PALSY FOLLOWING SPINAL ANÆSTHESIA

SPINAL block has proved of great advantage to surgery, but is not without its dangers. R. H. Martin and P. Halbron [1] report observations on 45 patients after operation under spinal anæsthesia, 8 of whom showed signs of injury obviously due to the anæsthetic. Four complained of headache, two of rectal incontinence, and one of retention of urine, while another suffered from ocular paralysis and a lesion of the trigeminal nerve. The first seven lesions were transient, the last very serious. They say that a search of published records shows that oculomotor palsy occurs in 1 to 5 per cent. of patients who have undergone operation with spinal block. The signs usually appear about a week after the operation, but sometimes much later, even up to two or three months. The lesion is usually, it is stated, a paralysis of the sixth nerve, generally unilateral, which gives rise to diplopia, and is often accompanied by headache. In addition, some patients suffer from auditory trouble, myosis on the affected side, and paralysis of the twelfth nerve. The illness, fortunately, soon disappears. They regard novocain as the least toxic and stovaine as the most toxic of the common anæsthetics, tropacocaine being between them. The theories of causation include meningeal irritation, hypertension, and intoxication, but Martin and Halbron think the first of these most probable.

OCCUPATIONAL THERAPY IN SANATORIA

AMONG the lectures given at the international post-graduate course of the Tomarkin Foundation two years ago was one by Prof. Hanns Alexander,[2] of Agra, near Lugano, on the principles and practice of *Arbeitstherapie* in tuberculosis institutions. Agra is an institution for the treatment of the educated middle classes, including amongst its patients physicians, lawyers, teachers, and students, and only a certain proportion—up to 50 per cent.—are capable of occupational therapy. Alexander lays down the general rule that any organisation for giving employment to patients must be elastic and capable of immediate reorganisation as the needs of the patient demand. He reminds his audience also that it is possible to achieve physically a cure of the pulmonary disease and yet leave the patient ethically more or less a wreck—in the words of the poet Klabund, himself a patient, "Er ist ethisch verlottert, ein Parasit des Menschentums." Fortunately such a psychical degradation is very rare, but Alexander considers that, for the consumptive faced with a long period of inactivity, occupation of some sort is both a right and a duty, especially for the intellectual patient. As instances of productive labour which he has found valuable he cites translation, proof-correcting, indexing, the preparation of scientific manuscripts for press, and the learning of foreign languages. Arts and crafts he finds rather more difficult. Occupational therapy of this kind must be of the nature of constant experiment and search until the right outlet is found. The list of subjects, from shorthand to music, which he has tried is a good indication of this incessant search for new outlets for the temperamental energies of the patient. The monetary value of the work is only lightly touched upon. In these times this consideration can never be far from the patient's thoughts, but the first and primary essential obviously is psychological happiness and contentment to tread a long and rough road back to health. Prof. Alexander has recently expanded this work into a monograph of considerable length, which was reviewed in our columns on April 1st.

[1] Paris Méd., March 11th, p. 217.
[2] Annalen der Tomarkin-Foundation 1932, ii., 1.

BLINDNESS IN PALESTINE

THE report for 1932 of the St. John Ophthalmic Hospital in Jerusalem makes somewhat painful reading, for Palestine has the highest percentage of blindness of any civilised country in the world. According to a carefully regulated census taken in 1931, in every hundred thousand of the population 843 were totally blind in both eyes, blindness being defined as inability to count fingers at a distance of one metre. This compares with 776 in Egypt, 420 in Cyprus, and 73 in England. Among patients attending the Ophthalmic Hospital, 81 per cent. of the blindness could be traced directly or indirectly to conjunctivitis. Last summer Dr. J. C. Strathearn, warden of the hospital, made a special survey of 11 villages, and in 792 out of 1118 blind eyes he found the same cause. Almost every peasant in the country is infected with trachoma; and although the incidence of this scourge amongst the townspeople is much less, 90 per cent. of out-patients attending the hospital are suffering from it. It is evidently impossible for the hospital alone to cope satisfactorily with this appalling problem, but it is making a valiant effort to mitigate it. Its annexe, where there is night accommodation for 150 patients, treated 3408 infants infected with acute conjunctivitis during the last three summers; of these 14 per cent. already had ulceration of the cornea, and of these eyes roughly one-half were hopelessly lost. The remainder were dismissed with scars, some of which may be compatible with some sight with or without appropriate surgical intervention at a later period. Cataract and glaucoma are operated on in Jerusalem as they are at home, but the resources of the hospital are not equal to dealing with the large number of patients requiring the less urgent operations needed for correcting deformities of the lids due to trachoma. Last year over 3000 patients suffering from trichiasis travelled to the hospital, but owing to the pressure of other operative work it was only found possible to deal with a tithe of them. Of the total operations (1099), only 393 were for the relief of trichiasis. There are now seven clinics for the mitigation of blindness established in different parts of Palestine and worked by Government doctors; to make them more effective periodic visitations by the surgeons of the hospital are being arranged. The report complains that they are not doing as much in the way of operating for trichiasis as they might do. It is hoped that in the coming year, by closer coöperation

between the clinics and the hospital, a far larger proportion of trichiasis will be relieved by operation. Moreover, the Government of Palestine has practically adopted proposals for the opening of additional clinics and the equipping of a travelling motor unit under a special officer. The Order of St. John has been invited by the Government to organise the establishment of a village school, where a staff of volunteers under British direction should train Palestinian girls to go into the villages and teach the fellahin the elementary rules of first-aid, hygiene, home nursing, and sanitation. In this lies the best hope of ultimately stamping out preventable blindness in Palestine.

HISTAMINE IN RHEUMATISM

Two years ago Deszö Deutsch recorded some results obtained by the use of histamine in muscular rheumatism. Compared with gold salts to which we referred last week, the remedy is more natural and its action is more clearly understood. The effect of histamine has been demonstrated by Lewis and Dale, who have shown that in any irritation of the skin—chemical, thermal, electric, or mechanical—a substance is liberated (which they have named H) which is similar to histamine, and which dilates the small vessels, increases their permeability, and accelerates the circulation. A similar effect may be obtained by physiotherapeutic measures, such as massage, hot air, baths, and diathermy, and also by application of plaster, blisters, and so forth. With histamine, however, it is much more powerful and more lasting; it may persist as long as ten hours after the application. A. Ravina, who reviews the subject in the *Presse Médicale* of April 1st, says there are different methods of applying the histamine—either by typical application or by subcutaneous injection. The local form of treatment is favoured by Deutsch, who applies blotting-paper impregnated with histamine, and attaches the anode of a constant current to this, making the patient hold the negative electrode in his hand. There is rapid reddening and heat of the skin under the pad; then little white blebs appear which coalesce to form a patch of œdema. The patch increases in size even when the application is discontinued, and disappears at the end of two hours without leaving any trace. The reaction is variable according to the subject, but is more marked in people who are lightly pigmented. The technique is of great importance, and failure to follow his method exactly explains, in Deutsch's opinion, Kaufmann's mediocre results. Another method that can be used is to apply the histamine as a pomade; it is massaged into the skin and then removed with ether. If a more intense reaction is desired, the skin may be scarified first. The original method of giving histamine was by subcutaneous injection, and good results are said to have been obtained with 0·5 mg. doses of the hydrochloride After the injection the face flushed and a mild headache developed, then the pain in the joints and muscles diminished, and subsequently the patient was able to do active and passive movements with greater ease and less pain. Jacchia, who it is stated used this method with considerable success, believes that there is no effect unless the drug enters the circulation, and it is true that after a local intradermal injection joints distant to the part became easier and looser; and, similarly, when the drug is driven in by ionisation, after a certain period of time a sensation of heat is felt accompanied by flushing of the face. Deutsch, however, considers that the action is purely local.

Histamine is of value only in the treatment of muscular and articular rheumatism, acute or subacute; it has no effect on tuberculous or syphilitic joints or on gouty or suppurative arthritis. Its effects are not in the nature of protein shock, it does not produce local antibodies, and it is not an analgesic or sedative in its reaction except inasmuch as it improves and accelerates the circulation in the affected parts. Whether it has any other action is as yet uncertain, but it is said that the injection of small doses provokes an increase in the alkaline reserve and an elevation of the pH of the blood with a big increase in the pH of the urine; the reverse takes place with large doses, and a mild acidosis is induced. Since in inflammatory conditions the pH of the synovial fluid is altered from the normal, which is slightly more alkaline than the plasma, to a less alkaline state, it is possible that small doses of histamine may help to restore the pH of the synovial fluid, but these hypotheses have as yet no experimental confirmation.

There are few contra-indications to the giving of histamine, but it is best avoided in the presence of marked hypotension or cardiac disease; if given in these cases it is best given by ionisation, thus avoiding the slight histamine shock produced by the intradermal route. It is evident that we have here a substance which appears to alleviate the pain of rheumatism. It will not take the place of salicylates, but it may succeed where they fail. Whether it has any wider use remains to be seen.

NATURE OF THE MENSTRUAL CYCLE

THE part played by hormones in regulating menstruation was briefly discussed in a leading article on Jan. 21st in connexion with a case in which, it was claimed, a true menstrual flow was induced in a woman who had undergone double oöphorectomy. The term menstruation was here used in its narrower sense as cyclical uterine bleeding from an endometrium which has previously undergone premenstrual hypertrophy. J. W. Corner has shown that cyclical bleeding can occur in primates without being preceded by ovulation and formation of a corpus luteum, but gynæcologists in general regard this as hæmorrhage from an "interval" endometrium rather than true menstruation from a uterus which has undergone full preparation for nidation of the ovum. The hypertrophied "interval" endometrium can be produced experimentally by injecting the œstrus-producing hormone (œstrin, folliculin, theelin, progynon), but in order to bring about the further—premenstrual or pregestational—stage the corpus luteum hormone is required. Granted this, the question next arises: What causes the hypertrophied endometrium to break down and liberate blood? Prof. Frankl, in the address reported on p. 909, maintains that the breakdown is due to involution of the corpus luteum with consequent withdrawal of "luteohormone" and sudden anæmia of the mucous membrane. In the presence of this anæmia, he says, the secretion of the glands digests the vessel walls and liberates the blood. Prof. Corner,[1] in a recent paper, reviews each of the theories in turn, and favours the hypothesis that menstruation is due to a sudden reduction of the amount of œstrin circulating in the blood. He rightly points out that there is some experimental evidence in support of this view. As regards the clinical work, however, the evidence is clearly inconclusive, and indeed it is remarkable how often uterine bleeding is recorded

[1] Medicine (Baltimore), February, 1933, p. 61.

after the administration of the different sex hormones. H. Hartmann's suggestion that the pituitary gland secretes a specific menstrual hormone has not been upheld by recent work, and somewhat similar remarks apply to the other hypotheses which have been advanced to account for the menstrual rhythm. At first the rhythmical control was attributed to the ovaries; at the present day there is a tendency to locate it in the pituitary. There is little evidence either way. What seems most clearly established is the difficulty of accounting for menstrual bleeding itself. Other factors in the sexual cycle are fairly accurately worked out, but menstruation itself seems to offer a difficult problem.

THE FAMILIAL INCIDENCE OF ANÆMIA

A LARGE number of cases in which several members of a family have had Addisonian pernicious anæmia, idiopathic pernicious anæmia, or achlorhydria, are recorded. C. W. Heath has recently described [1] one such family which shows a remarkably high incidence. Three sisters when first seen had severe hypochromic anæmia. In two of them this was associated with definite subacute combined degeneration of the cord, and after treatment with iron the anæmia became definitely megalocytic. The third sister had no nervous symptoms while her anæmia was hypochromic, but developed them later, when she was found to have a high colour-index but no anæmia. Such a rapid change from a microcytic to a megalocytic type of anæmia after iron therapy has not been recorded in other cases of idiopathic microcytic anæmia, though Janet Vaughan [2] described such a change in a case of anæmia following partial gastrectomy, when it is possible that removal of the stomach led to a multiple deficiency. Such a multiple deficiency was possibly also present in the three sisters described by Heath, lack of iron being at first predominant. The fact that nervous lesions were also present possibly supports such a hypothesis, since they are not usually found in the common type of microcytic anæmia. Heath suggests that his family had an inherited tendency to reduced gastric function affecting more than one of the factors essential for hæmopoiesis. The occurrence of Addisonian pernicious anæmia in identical twins at the age of 61, who had been separated for 16 years, recorded by J. C. Thomas,[3] raises interesting questions as to what may be the final factor in reducing the efficiency of already deficient gastric juice to such a degree as to cause anæmia.

ATROPINE AS A REMEDY FOR PARKINSONISM

AT present the treatment of parkinsonism following epidemic encephalitis leaves much to be desired, and this is all the more deplorable since the numbers concerned are appallingly high. In Germany alone it has been calculated that there are more than 30,000 persons suffering from the after-effects of this disease, and even in so small a country as Sweden the figures run to 4000 or more. In these circumstances it is interesting to hear of the tests recently carried out in Germany and elsewhere with large doses of atropine. Good results have been obtained in France, and in *Nordisk Medicinsk Tidskrift* for March 11th Dr. G. Kinberg describes encouraging experiences in six cases treated in Sweden, and surveys Roemer's experiences with patients whose numbers already run into three figures. It appears that the first impulse towards the treatment was given by Bremer, who made the surprising observation that patients suffering from the after-effects of lethargic encephalitis show an extraordinary tolerance to atropine. This tolerance is often proportional to the severity of the encephalitic sequels, and it has, apparently, not been acquired in the early acute stage of the disease. In large doses atropine is said to act on those centres of the brain which suffer most from encephalitis; but the argument seems to halt at this point. For even if the virus of encephalitis and a drug such as atropine have a special affinity for the same parts of the brain, the assumption that the drug must therefore counteract the virus seems a bow drawn very much at a venture. However, the results of this treatment are much more convincing than its rationale. Roemer's tabulated observations on 104 cases show that in an impressive proportion the most prominent manifestations of parkinsonism diminished or disappeared altogether. The dosage is gradually increased from 1 minim three times a day of a 0·5 per cent. solution till there is no further improvement, when the dosage is gradually reduced till the symptoms begin to recur. This point is a signal for gradually raising the dosage again. The amount of atropine to which a patient can be accustomed by this system of gradually increasing doses seems to vary within wide limits, and in one of Kinberg's cases 6·5 mg. were given three times a day.

[1] Amer. Jour. Med. Sci., 1933, clxxxv., 365.
[2] THE LANCET, 1932, ii., 122.
[3] Univ. Coll. Hosp. Magazine, 1932, xvii., 127.

HÆMOGLOBIN-PRODUCTION FACTORS IN HUMAN LIVER

THE original observation of Whipple and his fellow-workers, in 1920, that bovine liver contained factors potent for hæmoglobin regeneration in dogs rendered anæmic by hæmorrhage, was the starting point of the recent advances in knowledge of normal and disordered hæmopoiesis. Whipple and Robscheit-Robbins have lately offered a further interesting contribution [1] to our understanding of the pathogenesis and metabolism of anæmias. They have made a biological assay of the hæmoglobin-producing power of normal and pathological human liver. Human liver apparently contains a greater quantity of hæmoglobin-producing factors than the normal control animal liver, the ratio being 162 to 100. Livers which were normal except for atrophy dependent upon senility and arterio-sclerosis showed a lowered content of such factors. Reduced figures were found, too, in diabetes and in acute infections. Wide variations, at present unexplained, occurred in livers from patients with thyrotoxicosis. Livers showing cardiac congestion and consequent atrophy, amyloid degeneration, and carcinoma, also gave low values. This was possibly due to "dilution" of the healthy liver cells by abnormal cells. Cases of severe liver injury, such as cirrhosis and hepatitis, gave low figures, especially when associated with anæmia; the concentration of hæmoglobin-producing factors might then be less than a quarter of normal. As the authors suggest, "this invites speculation," since anæmia alone does not necessarily cause such reduction. Both aplastic and pernicious anæmia showed, as might be expected on theoretical grounds, extremely high values. Richter and his colleagues [2] had previously noted that storage of the specific factor effective in pernicious anæmia was reduced during a relapse. Recovery following adequate therapy resulted in a decrease in hæmoglobin-producing factors

[1] Whipple, G. H., and Robscheit-Robbins, F. S.: Jour. Exp. Med., 1933, lvii., 637, 653 and 671.
[2] Richter, O., Ivy, A. C., and Kim, M. S.: Proc. Soc. Exp. Biol. and Med., 1932, xxix., 1093.

and an increase in the specific factor. Secondary anæmia, due to loss of blood, even in long-standing cases, showed slightly lowered or normal values. There may be complete dissociation of the organic iron content and the concentration of hæmoglobin-producing factors in the liver; thus in anæmia due to hæmorrhage the latter were approximately normal, while the iron content was 5·3 mg. per 100 g., compared with the normal 12·3 mg. In aplastic and pernicious anæmia, on the other hand, both figures were high.

These observations indicate that the rôle of the liver in hæmopoiesis is extremely complex.

SURGERY OF SUPPURATIVE PERICARDITIS

PURULENT pericarditis, developing in a straightforward case of local suppuration which is otherwise progressing favourably, may be one of the most distressing complications encountered in practice. But the paper by Mr. Pyrah and Mr. Pain, on p. 905, makes it clear that the outlook is not necessarily hopeless, and Dr. P. E. Truesdale [1] has lately indicated certain principles which offer still further hope for successful surgery. It is an elementary fact, not seldom overlooked or obscured by theoretical speculation, that drainage of a suppurative process must usually follow the ordinary rules of gravity. Denis Browne [2] has emphasised this in connexion with the treatment of empyema in childhood, and Truesdale does so again when he points out how unsatisfactory was drainage of the pericardial sac in one of his cases when approached by the orthodox vertical parasternal route; whereas there was very successful evacuation of pus and complete recovery in a second case where the effusion was approached through a low horizontal incision in the seventh left interspace, beginning in the nipple line and extended outwards to the posterior axillary line. A similar line of argument has led other surgeons to choose an approach between the xiphisternum and the seventh costal cartilage—at any rate for needling.[3] Truesdale discusses this method, but is able to quote instances where a still more dependent point had subsequently to be sought by a low horizontal incision like his own. The main argument against this approach from the outer side is the danger of contaminating a healthy pleura; but if drainage is inadequate this danger seems to be slight compared with the hopeless effects of inadequate drainage by a "safe" incision. Actually in Truesdale's case, when the chest wall was incised, the pericardium was seen with its lower surface resting on the dome of the diaphragm and its outer border extending to the left, virtually in contact with and adherent to the parietal pleura. The adhesions thus produced completely excluded the general pleural cavity, and this good fortune must be held in part responsible for the satisfactory result. Truesdale concludes his valuable paper with a summary of new and old cases, and lays stress on the fact, remarked on by Osler, that the involvement of the pericardium in the course of some other disorder is often overlooked. The first step towards lowering the mortality-rate is early diagnosis, the next is early intervention, and the third is adequate drainage. Truesdale makes a strong case for his method of securing this last, and it is evident that Pyrah and Pain had some misgivings about their line of approach—actually by excising the fifth costal cartilage—for they say that although satisfactory drainage was apparently achieved, "the tube did not perhaps drain the lowest part of the pericardium." In discussing the routes available they mention only those close to the sternum, and to justify not having drained at the most dependent point they maintain that "drainage of the pericardium depends to no small extent on the action of the respiratory and cardiac movements." Truesdale is not impressed with this line of argument; for if anything, he says, the negative pressure within the thorax will impede drainage, and downward pressure of a normally expanding lung is of great assistance only when the drainage opening is made at the most dependent point in the pericardial sac. The two papers are agreed in urging that drainage must be adequate, and each reports a successful termination for a particular method. It may be concluded that (as in Truesdale's case) a failure by the parasternal route should lead to prompt intervention in another situation.

[1] New Eng. Jour. Med., March 30th, p. 671.
[2] THE LANCET, 1930, ii., 733.
[3] New Eng. Jour. Med., April 13th, p. 774.

TREATMENT WITH STAPHYLOCOCCAL TOXOID

A USEFUL account of the use of toxoid in localised staphylococcal infections is given by C. E. Dolman.[1] He begins by describing the hæmolytic, necrosing, and lethal actions of the toxin and the preparation of toxoid from it by treatment with formalin. The object of this treatment is, of course, to remove harmful properties while preserving antigenic power, and stringent tests have to be made before it is used in therapeutics. Preliminary tests on normal men and on animals showed that successive subcutaneous injections of increasing amount produced a rise in the antitoxic titre of the serum. These injections, like those made later in the treatment of patients, led to a varying amount of local reaction, but were never so severe as to make the continuance of injections inadvisable. In treatment the number of injections varied considerably, but an initial dose of 0·05 c.cm. was given, and this was increased gradually with 5–7 days' intervals up to 0·2 c.cm. Serum was obtained before treatment began, and after the fourth injections (0·2 c.cm.), so that the antitoxin might be titrated. Very few details are given of the "28 patients suffering from intractable staphylococcic infection who have been successfully treated," but 16 of these were cases of recurrent boils, and good results were obtained in all of them. The antitoxin in the blood before treatment was low in these cases, and it was found that raising of the titre led to cessation of the boils. A good response was also obtained in cases of pustular acne and dermatitis, cellulitis, and sinusitis, but no mention is made of sycosis barbæ. Although few clinical details are supplied, apart from one case, this paper strongly suggests the advantages of using toxoid in the treatment of certain types of staphylococcal infection. Preparations from autogenous strains are unnecessary, since all toxigenic staphylococci produce qualitatively the same toxins.

AT the council meeting of the British Medical Association held on April 12th a letter was addressed to the chairman of the central public health committee of the London County Council asking the Council to give further consideration to the conditions of employment of part-time consultants and specialists and to accept the offer of friendly conference through suitably appointed representatives. A committee was appointed to act on behalf of the consultants, consisting of Sir Henry Brackenbury, Dr. C. O. Hawthorne, Sir Ewen Maclean, and Mr. H. S. Souttar.

[1] Jour. Amer. Med. Assoc., April 1st, p. 1007.

SPECIAL ARTICLES

BLOOD ALCOHOL TESTS IN ACCIDENT CASES

Now that it is an offence to be in charge of a motor vehicle when under the influence of drink to such an extent as to be incapable of having proper control, some reliable test of the amount of alcohol that a person has recently consumed would be a very desirable thing. The effect of alcohol upon the behaviour of a driver depends upon two factors: the alcohol content of his blood, and his tolerance to alcohol. A considerable amount of work has been carried out recently by continental workers on the Widmark test for alcohol in the blood. This test requires a single drop taken in a special capillary tube, and has been shown to give accurate results in the hands of a competent chemist. Dr. Richard Goldhahn has recently [1] surveyed the work of others on this test, and given an account of his own work. The medico-legal difficulty arises in correlating the blood content with individual tolerance. Widmark found that with the higher concentrations, in the neighbourhood of 2 per 1000, the percentage of cases in which symptoms were observed did not rise side by side with the alcohol concentration, but noticeably fell off. Goldhahn is satisfied, however, that this result was due to defective observation on the part of the police surgeon, probably because of the interval which sometimes elapses between the accident and the medical examination; for he found that according to the police all the cases returned as negative by the doctor had shown unmistakable signs of drunkenness before the examination. If his conclusion is right, the clinical symptoms of drunkenness should closely follow the blood concentration and bear out the well-known law of toxicology that the greater the concentration of a poison the narrower the limits of individual variation in response. Allowing for these observational errors, he claims that the Widmark curve gives a close indication of the relative frequency with which clinical drunkenness may be observed. At a concentration of 0·8 per 1000 no sign of drunkenness was seen; at 1·3 per 1000 half the cases showed signs of the influence of drink; and at 2 per 1000 its influence was observed in all cases. No precautions were taken in these experiments to exclude persons who by reason of epilepsy or other cerebral disorders were abnormally susceptible to the influence of alcohol.

Widmark fixed the figure of 1·6 per 1000 as the limit above which the alcohol concentration renders a man unfit to be trusted with a motor vehicle. Goldhahn considers that this figure is far too high for cyclists and motor-cyclists, and that they become unsafe on a much smaller concentration, because balance is one of the faculties most quickly affected by alcohol. He quotes an interesting table from Remund to show the much greater risk which cyclists and motor-cyclists run from indulgence in alcohol than that run by motorists and pedestrians. It appears that blood acetone cannot seriously affect the result, because acetone is never present in the blood to a concentration higher than 0·3 per 1000, whereas the alcohol concentration in a case of clinical drunkenness is in the neighbourhood of 2·0 and over. Experiments on a diabetic showed that his blood tended to give a low reading rather than a high one. The concentration of 0·03 per 1000 normally present in the blood of an abstainer was not observed in this diabetic. Goldhahn considers that there is no evidence for the existence of exceptional production of alcohol in the organism in any pathological conditions, such as pyloric stenosis with fermentation. He says that the test, in conjunction with the body-weight and the period that has elapsed since the alcohol was taken, enables an observer to calculate the exact amount of alcohol ingested, the error being 10 per cent. at the outside. He suggests also that pedestrian victims of road accidents are, in a surprisingly large proportion of cases, under the influence of alcohol, and that a blood test taken immediately on their admission to hospital would often exonerate the driver of the motor vehicle.

Objective tests of this kind are not popular in English procedure, partly because the national temperament does not take kindly to scientific evidence, and partly because the law does not permit tests to be made on anyone without his consent. Valuable as it would be, the routine testing of the victim of an accident immediately on arrival in hospital seems to be out of the question. It might, however, be well worth a solicitor's while to bear in mind the possibility of having a test done on a client immediately after his arrest on suspicion of drunkenness in charge of a motor vehicle, if he were fairly certain that the result of the test would be in his favour. A negative report on a sample of blood taken a short time after an accident should dispose altogether of any accusation of drunkenness; that seems to be one lesson of the further Scandinavian experience, an account of which we published last week (p. 892). The question has been dealt with fully in this country by Prof. Edward Mellanby, Dr. H. W. Southgate, and Dr. Godfrey Carter. These workers have produced valuable results on the urine content of alcohol, which they find corresponds to that of the blood but shows a higher percentage. The legal difficulties in the way of taking samples of blood are not so great an obstacle to the testing of urine. It seems reasonable that if a police surgeon is allowed to examine the conjunctival reflex and to make other physical tests, he should be allowed to test the urine for alcohol. Dr. Carter quotes a case [2] in which a man was tried at assizes for manslaughter and drunkenness in charge of a car. The judge at that trial remarked that when a patient saw his doctor in private it was customary for the doctor to examine the urine, and that it was perfectly fair to use this test for the purpose of measuring intoxication. Some legal authorities would perhaps agree with this proposition. It would be fair to inform the accused that the test was being done, and, if he refused, to put that refusal in evidence. If he was innocent, the test would infallibly be in his favour.

[1] Med. Welt., March 11th, 1933, p. 336.

[2] Law Journal, 1928, i., 99.

NEW BLACKPOOL HOSPITAL.—A new hospital is to be erected at Blackpool at an estimated cost of £130,000, of which £60,000 is being lent by the corporation and a similar sum has already been raised. The site of between eight and nine acres at Whinney Heys has been given by the corporation, and in return for municipal help the hospital will coöperate with the health department in the provision of maternity and child welfare wards. There will be 177 beds—surgical, 65; medical, 36; maternity, 32; children, 28; paying, 16. For the present the out-patients' department will remain at the old building. Lord Derby will lay the foundation-stone in July.

BRITISH EMPIRE LEPROSY RELIEF ASSOCIATION

A MEETING of this association was held at the India Office on April 20th. In consequence of the recent death of Lord Chelmsford, Sir Edward Gait, chairman of the executive committee, presided.

Sir Leonard Rogers said that the work of the association had within a single decade altered the outlook of the millions of sufferers from leprosy. Fifteen years ago our only measure for controlling leprosy was imprisonment for life without hope of even checking the progress of the disease, with the natural result that cases were hidden as long as possible. In 1915–17 Calcutta investigations established the value in not too advanced cases of injections of soluble forms of the active principles of chaulmoogra and hydnocarpus oils, which had now passed the realms of controversy. The means to reduce leprosy greatly within a single decade were now available wherever the simple plan advocated by Sir Leonard could be carried out. This plan was based on two facts: (1) some 80 per cent. of infections were contracted by living, usually for long, in the same house as an active leper; (2) the incubation period in 80 per cent. of cases is less than five years. If the house contacts of all discovered cases were examined repeatedly for ten years to detect and clear up cases in the early and little-infective stages, during this time the patients in an advanced infective stage would nearly all have died or have passed into an uninfective stage. The result of this plan would be that too few contagious cases would remain to maintain the disease. It was only under exceptional conditions that this plan had as yet proved feasible, but data regarding leprosy in Nauru Island, in Oceana, and in the Southern Sudan had demonstrated its efficacy. A serious epidemic had occurred in the small Nauru Island in 1925–26 following the debilitating effects of influenza combined with deficient diet. On examination of the whole population (approximately 2000) four years later, no less than 750 persons, or 30 per cent., were found to be infected. Over half of these were in the early uninfective stage, and were treated as out-patients; the rest were segregated, less than 5 per cent. of the total number of cases having reached the advanced nodular stage. Three years later Dr. G. W. Bray reported that the patients showing any sign of leprosy had been reduced by 40 per cent., and not a single early case had gone on to an advanced stage. In 1932 half of the infective cases had cleared up, and the epidemic was under control. In the Southern Sudan the problem was a far more difficult one, for a survey arranged by Dr. O. F. H. Atkey of the whole widely scattered population of the infected area revealed 6500 cases, or over 5 per cent. of the people, some ten times the census rate in India. Thirty square miles of land was taken up for a huge leper colony of the 4800 infective cases, mostly early ones, who grow their own crops, and are therefore largely self-supporting, in marked contrast to the cost of over £200 per head of segregated lepers in New South Wales. A recent report shows that within the last year 2230 lepers had been discharged free from all signs of leprosy. Success depended, however, on finding the cases in the early stage. This had so far proved to be impossible under the old rigid compulsory segregation, which now did more harm than good by causing the early cases to be hidden until long passed the amenable stage. In South Africa, in the vast majority of segregated cases, the disease was of four or more years' duration, and in the Philippines it averaged eight years before they were discovered and isolated, during which time they had been infecting others. In tropical countries also the segregation system had been a lamentable and costly failure in its avowed object of stamping out leprosy. The association had just sent an experienced leprologist, Dr. T. B. Welch, to tackle the leprosy problem among the 200,000 people of Zanzibar on the lines so successful in Nauru. Sir Leonard described the work of the association in various parts of the Empire. In India Dr. E. Muir and his assistants carried on continuous research in the Calcutta School of Tropical Medicine and in the field. About 1000 doctors have been taught the modern methods of treatment in Calcutta, or at Dichpali in Hyderabad, the most modern leper hospital in India, which had suffered a grievous loss in the death of Dr. Isabel Kerr. In tropical Africa, which contained at least 150,000 lepers, efforts were being made to prevent infection of children, who were highly susceptible to leprosy. British Guiana was heavily infected with leprosy, and progress had for long been retarded by adherence to rigid segregation. In British Guiana the dispensary treatment of non-segregated cases had been adopted. It was to be hoped that our West Indian Islands would also adopt more efficient modern methods in place of segregation.

A rapid reduction of leprosy in the Empire could be achieved if funds were available. The association had only had an annual income of between £5000 and £7000, but had supplied half a million doses of the new preparations a year, had published and distributed a *Leprosy Review*, distributed abstracts of leprosy literature, and had supplied seeds of hydnocarpus trees, from which several thousand trees were now flourishing from the West Indies and Africa to Fiji. The association could justly claim to be worthy of being entrusted with funds, the wise expenditure of which would do away with the necessity for many decades of expenditure on half measures. The economic crisis had led to the retrenchment of the Nigeria and Gold Coast leprosy work just when additional whole-time men were most required, and the association only needed a few thousand pounds a year additional income to double the value of its campaign and to launch a more effective crusade.

Rev. P. B. Clayton spoke of his personal experiences of the leprosy problem in Africa, and said that the efforts being made by the association had the deep sympathy of Toc H.

MEDICINE AND THE LAW

Sale of Milk by Special Designation

THE compulsory pasteurisation of milk, lately a matter of municipal controversy at Manchester, is not yet the law of the land. Parliament in 1922 preferred the alternative of voluntary standardisation. The 1922 Act establishes certain special designations—"certified," "Grade A," "pasteurised," or such other designation as may be from time to time prescribed by order of the Minister of Health—and it seeks to ensure that a purchaser who asks for a particular designation will get it. A prosecution at Kensington last week suggests that the law is not quite clear. The 1922 Act and the Milk (Special Designations) Order of 1923 together enact that milk of one of these special designations must not be sold

or advertised for sale except under the conditions of a licence granted by the Minister or authorised by him in the terms of his order. The 1923 Order prescribes the form and conditions of various licences. At the beginning of this year United Dairies (London), Ltd., obtained from the Chelsea borough council one licence to sell "Grade A (tuberculin-tested) milk," and another licence to sell "Grade A milk pasteurised." In the Kensington police-court the borough council complained that the company sold bottles of milk with the designation "United Dairies Superity Farms," not mentioning "Grade A" or specifying the designation of the milk in terms of the licence; in its advertisements the company referred to "Grade A (T.T.) Pasteurised Milk." The council alleged that this was an infringement of the conditions of the licence. There was no such milk, it said, as that to which the company's advertisement referred. It was a condition of the licence to sell "Grade A (tuberculin-tested) milk" that the milk should not at any stage be treated by heat. It was a condition of a licence to sell "pasteurised milk" that the milk should be retained for half an hour at a temperature between 145° and 150° Fahrenheit. Parliament intended that purchasers who wanted either tuberculin-tested milk or pasteurised milk should be sure of getting what they wanted under a clear designation. Counsel for the company protested that a licensee was not necessarily bound always to sell milk under the particular designation named in the licence. The Bench, however, convicted the company and imposed fines and costs.

UNITED STATES OF AMERICA

(FROM AN OCCASIONAL CORRESPONDENT)

THE CALIFORNIAN EARTHQUAKE

On March 10th a severe earthquake caused damage in an area of approximately 30 by 40 miles in two countries in Southern California. Owing to the repetition of shocks residents of Long Beach and other cities were unable to return to those homes that were still standing. A double problem in sanitation was thus created: first, the destruction of plumbing and sewerage by the earthquake itself; secondly, the creation of emergency concentration camps in the open.

The chief of the bureau of sanitary inspections of the State department of health took immediate charge of the situation. The area of devastation was divided into districts, and house-to-house surveys were made in each district. The investigation included observation of the water-pipes and sewers and of the need for garbage disposal, and at the same time inquiry was made for sick or injured persons in need of treatment.

State inspectors also took charge of the sanitation of the camps and made use of the machinery for unemployment relief to secure the labour required. Small and isolated camps were broken up and the campers were concentrated. A disinfecting crew was organised; also a rodent control squad. After ten days the campers were able to return to their cities in safety. Although typhoid immunisation was provided as a prophylactic measure, no evidence was found that any condition arose due to the earthquake which created a menace of infection with typhoid.

AFTER PROHIBITION

Several States are now engaged in setting up machinery for the control of the liquor traffic in anticipation of the repeal of the Eighteenth Amendment. The danger of unrestricted drinking as a reaction from the years of legal restraint is widely recognised, and distribution of alcoholic beverages will remain under control of one kind or another. One suggestion, that such beverages be distributed through the "drug stores" that now handle the bulk of the business in soft drinks, has been energetically opposed by the American Pharmaceutical Association. The association contends that pharmacists are now charged with the distribution of medicinal alcohol, and that the interests of public welfare and public health require that this shall not be confounded with the distribution of beverage alcohol. The association is opposed also to the distribution through drug stores of malt beverage, "because it would be contrary to the essential purpose and important responsibilities of pharmacy in relation to the people and to public health, and because, through such distribution, an activity foreign to its purposes and ethics would be introduced."

FLUORINE SPRAYS PROHIBITED

The regulations of the Department of Agriculture requiring the removal of lead arsenate spray residue from fruits and vegetables has led to a search for some other insecticide, and it appears that certain fluorine compounds have been suggested as a substitute. The department's bureau of food and drug administration has now issued a warning that they regard all sprays containing fluorine with suspicion, and that no fruit or vegetables with fluorine spray residue may be shipped in interstate or foreign commerce.

PARIS

(FROM OUR OWN CORRESPONDENT)

REFORM OF THE MEDICAL CURRICULUM

Important decisions were taken on March 22nd by the committee charged with the revision of the medical curriculum. The process of revision has now reached a stage at which there is little left to be done but dot *i*'s and cross *t*'s. This will be the duty of the Conseil Supérieur de l'Instruction Publique and the responsible Government official, who will have to devise means for bridging over the old and the new in the transitional period. The most important change is the addition of a sixth compulsory year to the curriculum. This year is to be devoted exclusively to practical studies—one winter and one summer term. Though obligatory, this year will give the student opportunities to choose between the specialties which best suit his bent: he may specialise in medicine, general or special surgery, or in obstetrics, all according to his own will. The costs of this sixth year? The authorities have realised that it would be unfair for the medical student and his relations to bear all the costs. The institutions in which he must pursue his studies will, therefore, be requested to temper the wind to the shorn lamb by lodging and feeding him more or less free of charge in return for his services. In order that the examinations may be conducted on lines conducive to impartiality, the practice of local examinations will be discouraged and the students will have to sit for their examinations at headquarters in an atmosphere of detached and anonymous impersonality. To avoid overlapping, competition, and other sources of friction and misunderstanding between the various disciplines,

it is proposed that in every faculty there shall be a commission whose duty it will be every year to review and revise the working of the whole medical curriculum.

THE CERTIFICATION OF DEATH

One reason why the fear of premature burial has such a hold on the popular imagination in this country is that hitherto a goodly proportion of the population has been buried without the cause of death being known or a doctor being informed of the circumstances under which it occurred. In this connexion it may be useful to refer to a report recently published by the Comité National de Défense contre la Tuberculose. It showed that in 1926, among 712,751 deaths in the whole of France, there were as many as 152,672 the causes of which were unknown —a proportion of 21·4 per cent. Local differences in this respect are enormous. In Dijon, for example, this proportion is 76·8 per cent. This means that the authorities are in ignorance of what three-quarters of the population of Dijon die of! Even in such a large town as Marseilles, the cause of every other death is unknown. In Nancy, on the other hand, this proportion is down to 2 per cent.; and in Calais it is as low as 0·61 per cent.—an achievement which seems almost too good to be true. In a communication to the Academy of Medicine on April 4th, Prof. L. Balthazard presented a report on the measures recommended by the commission appointed to inquire into the problem of the premature burial. This problem, as envisaged by the commission, is not so much one of devising tests by which the apparently dead may be shown to be still living as of ensuring an effective system of expert medical supervision of all deaths. The commission proposes that the local authorities shall appoint one or more doctors as official consultants in this respect in every district. As soon as a death has been notified at the town hall the medical consultant will receive a note on which are recorded certain particulars such as the name, sex, age, and profession of the person who has died, and, as far as possible, the nature of the disease of which he has died, the name of the doctor in charge and of the chemist who has supplied drugs. This arrangement should enable the authorities to intervene and withhold permission for burial in those cases in which the medical consultant had doubts about the death and the cause thereof. No one should be buried till 24 hours have elapsed since the notification of the death at the town hall. Provision is, however, made for disregarding this regulation in special cases.

AUSTRALASIA

(FROM OUR OWN CORRESPONDENT)

THE CANCER CONFERENCE

THE fourth Australian Cancer Conference was held at Canberra, from March 1st to 3rd, and delegates attended from all the States of the Commonwealth and from New Zealand. A statistical review of the cancer mortality during 1932 was given, and it was shown that the death-rate from cancer up to the age of 79 years is falling, but after this age is rapidly rising. The review of cancer research for 1932 indicated that particular attention had been paid to radium and that a search was made for a test useful in the early diagnosis of cancer. Considerable attention was also given to the administrative aspects of radium—its storage and issue, and protective measures—and to mass treatment with the radium bomb. A special circular has been issued by the Commonwealth Government on "Precautions against the loss of Radium." Last year 66 mg. were lost in the Commonwealth, and the circular recommends the adoption of a token system in hospitals where radium is used, together with certain ward and other precautions. It was considered that improvements in deep X ray apparatus and technique, whilst being less expensive, would achieve all that could be expected from a radium bomb, and that the Commonwealth should aim at advancing deep X ray work rather than at acquiring a bomb. The greater part of the last day of the conference was given up to a discussion on various aspects of gynæcological cancer.

THE MEDICAL PROFESSION IN GERMANY

THE events of the past few weeks have had a great effect on the medical profession in Germany, and the campaign against persons of Jewish faith or Marxist principles has been accompanied by reconsideration of medical organisation both by the profession and by the Government.

The *Münchener medizinische Wochenschrift* (April 14th, p. 592) contains a summary of the Act which authorises the dismissal of doctors who, either through their race or their political opinions, are unlikely to "embrace the ideals of the new régime wholeheartedly." The journal states that under the terms of the Act non-Aryan doctors who have served the State for many years will be unaffected, or, at least, enabled to retire honourably without loss of superannuation or pension. Those who have one or more Jewish grandparents will be exempt if they were employed before August 1st, 1914, served at the front during the war either for Germany or her allies, or have fathers or sons who were killed in the war. Under the Act the political offenders are more hardly hit, for they are to be dismissed with three months' salary, and only if they have ten years' service will they be able to claim three-quarters of their superannuation allowance.

On the positive side two important developments are recorded in the various weekly journals which reach us. The Minister of Labour has placed the five regional panel committees under his supervision, and has appointed a director who will be responsible for the administration of the Krankenkassen (sick-clubs). On March 31st he circularised the Landesregierungen (State governments) requesting an immediate inquiry into the financial position of the clubs.

The other development comes from the medical profession itself. In order that the changes may be carried through as smoothly as possible the German Ärztebund has united with the Hartmannbund, and they have chosen as their joint president Dr. Gerhard Wagner, of the National Socialist Ärztebund. The two executives will continue to serve in coöperation with him. Dr. Wagner has sent, on behalf of both associations, loyal messages to the President and to the Chancellor, and has appealed to members of the associations to give every assistance in expelling Jewish and Marxist doctors from sick-club and insurance posts. At an executive meeting of the two associations on April 1st and 2nd, he said that he had already approached the Minister of Labour on the questions of the coming dismissal of Jewish doctors and of the importance of medical

advice in questions of racial hygiene. On April 5th he was received by the Chancellor, Herr Hitler, who promised to obtain more scope for Germans through the eradication of foreigners.

At a meeting of the executives of the two associations with the National Socialist German Ärztebund, renewed confidence was expressed in the leadership of Dr. Wagner. He described in general terms his plans for the future, which include the re-staffing of the sick-clubs and the revision of the regulations for the appointment of insurance doctors. As a final goal, he mentioned the establishment of a commission to deal with the distribution of population and allied problems.

An editorial note in the *Deutsche Medizinische Wochenschrift* for April 21st suggests that all German teachers and scientists who have personal associations abroad should use their influence to discount the propaganda of the foreign press. Meanwhile, the Prussian Minister for Home Affairs has issued a decree that no licence to practise will be issued to any foreigner, even though he may have studied and taken his degree in Germany. Exception will only be made in cases where the candidate is of German descent. In future foreigners will only be admitted to medical qualifying examinations on the understanding that they do not intend to apply for a licence to practise.

THE DOCTOR'S DAY

"Come, tell me how you live," I cried,
"And what it is you do!"

XXV.—PORT MEDICAL OFFICER

THE insistent telephone bell at last rouses me. "Hello Doc.," says a cheerful voice, "s.s. *Sunrise* is arriving at 5 A.M. instead of 6, and it's blowing up nicely outside." So the alarum clock is set for 4 A.M. instead of 5, and I settle down again to sleep. Half-past four finds me speeding dockwards ready to accept my responsibility of protecting the town and country against invasion by infectious disease. The launch is waiting and I descend the dark and slippery steps. A helping hand steadies me as I jump aboard. The engine-room bell rings and we are soon heading seawards; past the pier we encounter the full force of the gale. I retire below, not wishing to brave the elements, and investigate the contents of the medical case to pass away the time: stethoscope, first-aid set, electric diagnostic case, torch, copies of the score or so different official forms issued by the Port Sanitary Authority, vaccination kit, diphtheria swabs and serum—all are in order. One of the deck-hands informs me that the *Sunrise* has slowed down and we are going alongside. I enjoy the expert seamanship as the launch is brought alongside the towering liner, and select the moment to jump for the dangling rope-ladder just as the launch reaches the crest of a wave. The ascent of some 20 rungs brings me on deck. The ship's surgeon—a trustworthy old-stager—meets me at the top and, in reply to my routine questions concerning the health of the ship, states that he has three lascars with influenzal pneumonia, and two of the white crew with malaria. The lascars are visited in the dingy forecastle, and I overhaul them by the light of the torch. No rashes, no sore-throats or suspicious features as far as one is able to tell in these dusky surroundings, and the result of the chest examination confirms the surgeon's diagnosis. Another lascar in a bunk arouses my interest, but the surgeon is quick to allay my doubts by explaining that this patient is suffering from burns of the legs and consequent septicæmia. We proceed to the surgeon's cabin, after I have satisfied myself about the diagnosis of malaria in the case of the two white seamen. I then collect the papers about the health of the ship. The vessel has no aliens on board, and I am free to await the arrival of the next ship, due at 7 A.M. There is nothing of medical interest on this vessel except a Russian suffering from melancholia, for whom, in accordance with the Aliens Order, 1920, I fill in a certificate to the effect that an alien is in my opinion suffering from an illness in category (A). The immigration officer then refuses him permission to land, and the shipping agents, having made special arrangements to land him, are naturally annoyed. The little tiff will soon be over; shipping communities are easy to work with, and the spirit of goodwill is always well to the fore. I take breakfast with the ship's doctor and leave in the launch for the shore, thus saving a good half-hour.

REPORTS AND THE DAY'S PROGRAMME

At 9.30 A.M. each morning, when boarding duties permit, I visit the office, which is situated within the docks. The correspondence usually takes me about half an hour. The postbag does not lack variety. There is the usual mass of advertising literature which is fired daily at medical men by enterprising firms. A communication from London states that the distributors refuse to sign the voluntary surrender notice, sent by the Port Sanitary Authority, concerning 50 cases of unsound tinned meat. The firm is of the opinion that the meat is in good condition and proposes to send down a real food expert. Pocketing the insult, I reply that we propose to hold the goods for six days, during which any one may examine them. At the end of that time, if the voluntary surrender notice has not been returned, the port sanitary officials will obtain a magistrate's order for destruction of the food. In all probability the notice will be signed without further ado; very rarely do judicial proceedings become necessary. The inspection of imported foodstuffs forms a large part of the routine work in the department, and the port medical officer must have a sound knowledge of the normal conditions of vegetables, fruit, fish, meat, and dry goods, so that he may detect immediately any deviation from the normal liable to be of harm to consumers.

Among the mail are notifications of infectious diseases occurring in foreign ports sent by the Ministry of Health, and a note from the borough pathologist stating that there was no bacteriological evidence of plague in the organs of four rats he received a few days ago. A message from the venereal disease officer informs me that the Wassermann reaction of a second mate of a cargo vessel, whom I sent to him, was positive, and that the man has been admitted for treatment.

The chief sanitary inspector brings in his report for my approval. On the previous day the inspectors have been over 20 vessels and found defects on six, four of them being British. Notices have been served on the vessels, and as one of the masters is a constant defaulter I propose visiting his ship during the day. Another large consignment of lower-grade tinned fruit has arrived, and since it was reported that over half has not passed the inspector, it will be my duty to see it. Two hundred rats were recovered after the fumigation of a grain vessel and the rat-catchers have brought back the catch in sacks. I shall select a dozen of these and dissect them for evidence of plague and also, if I have time, comb a few for-fleas, which will be forwarded to a colleague at a neighbouring port who is doing research work on rat-fleas. My chief interest lies with tinned foods, and he reciprocates by sending me choice samples. The inspector wishes me to see two men on a collier with spots. A rough programme for the day's work is drawn up in accordance with requests

in letters and the requirements of the inspector, allowance being made for the unforeseen which so often happens. Three deratisation exemption certificates are now ready for my signature.

VISITS IN THE DOCKS

A large grain boat is to be fumigated this morning with hydrocyanic gas, and since it is being done by a new firm, I go there to watch proceedings. The vessel is alongside a wharf, and we gain access by a rickety ladder. The inspector has checked up the capacities of the various compartments and holds, also the quantities of material required. We go quickly round to make sure that all compartments are securely sealed and that no ports or other apertures are left unguarded. The contractor's men are left to commence fumigation, and we return to the wharf, having ascertained that no other person has been left on board.

A little further along the wharf is the collier to which the inspector had made reference earlier in the morning. The two seamen are brought up for my inspection; one is suffering from impetigo of the face, the other from an acneiform rash on neck and back. They are referred to a local practitioner for treatment. Infectious disease is often detected through the vigilance of sanitary inspectors while following their routine duties.

Just as we are leaving the ship a messenger comes running to inform us that one of the men engaged in the fumigation is gassed. We return immediately to the first ship, clamber up a rope since the ladder has been removed, slip on a spare respirator, and find the victim in the galley where his mate has dragged him. The contractor's first-aid set is to hand and I give him a hypodermic injection of a special German preparation which is regarded almost as a specific in these cases. It is followed up by hot coffee and heroic measures to keep him conscious. His air-hunger and gasping breathing are mitigated somewhat, and an ambulance is sent for. When it arrives in about ten minutes his condition is practically normal.

Another ship presents an ornithological problem. An officer of H.M. Customs draws my attention to a bird in possession of the chief engineer. He thinks the bird is of the parrot species and, in accordance with regulations, has notified the medical officer. Examination reveals characters common to the psittaciformes, and a notice prohibiting landing of the parrot is served on the owner. He is unaware of the requirements of the Ministry of Health and protests volubly, but as the alternative is destruction of the parrot he elects to keep it on board.

FOOD AND FORECASTLES

After lunch the inspector joins me in order to visit the food warehouses, where the consignment of canned foods is ready for inspection. More than 10 per cent. of the cases have been opened by the inspectors, and I select individual tins for detailed investigation. Each one is blown, and I have no hesitation, after examining several, in condemning the consignment. There are instances where the tins are of the "springer" variety, and it is difficult to say whether the content is sound or not. Such experience is gained only after constant practice and close observation, and one must proceed with extreme care before forming an opinion. The percentage method of examination works exceedingly well in practice, but in cases of doubt or dispute we usually arrange for the whole of the consignment to be gone through in detail. A rapid glance is cast over other consignments of food lying in the warehouses, but there is nothing to attract special attention.

On arrival back at the office two telephone messages are awaiting me. One is from the house surgeon of the hospital stating that he can find nothing wrong with the man I sent him in the morning; and the second is from the aerodrome to the effect that three aliens who have just landed from the Continent are being held for medical inspection. A five-mile run out to the aerodrome affords a pleasant change from dock and shipping duties. The inspection is completed and all formalities observed, and I return via a quay situated some two miles up the river.

The recalcitrant captain of the British vessel (referred to by the chief inspector) is in town, and on boarding the vessel I draw a blank. The ruse of not approaching by launch has failed this time; however, I shall be going up river in the morning to advise the railway company about the rat-proofing of one of their stores, and so will take the opportunity to pay him another call. A cursory inspection of the appalling hygienic conditions in the forecastles assures us that the reports of my inspector are not exaggerated. One cannot help comparing the conditions under which the average British seaman exists with the conditions for seamen of, say, Norway or Sweden. Port medical officers in Britain must wish constantly that they could have some influence with the Board of Trade in the formulation of the regulations.

THE FIRST LINE OF DEFENCE

At 6 in the evening the motor-launch *Goodhealth*, the property of the Port Sanitary Authority, slips her moorings and is soon under way to meet a liner from the Far East. On this occasion, besides the port medical officer, she carries the chief and second sanitary inspector and two clerks. There has been a considerable flutter in official circles during the week, for the vessel has already landed six cases of small-pox "down the line," and a wireless message received from the ship during the afternoon requested stretchers and hospital accommodation for three more cases. I find the cases are among the native crew, and that they present pustules of a typical nature and distribution. The diagnosis confirmed, steps are taken to examine the rest of the crew immediately, and, with the inspectors and clerks keeping accurate tally, I proceed to inspect the heads, chest, arms, and feet of 250 lascars. Three suspicious cases are weeded out: one can show a successful recent vaccination, but I make arrangements for the other two to be landed. Full particulars, including history, date of onset, and course of disease in each case, are obtained. The white crew are inspected but nothing untoward is elicited. At the last port of call an additional supply of lymph had been taken on board and the entire crew vaccinated, as well as the majority of the passengers. I succeeded in persuading two "objectors" who are landing to accept vaccination at my hands. A further duty awaits me of scrutinising all landing passengers, and the clerks obtain addresses to which each one is proceedings. The medical officers of health of each of these districts will receive intimation that a contact of small-pox from the s.s. —— is proceeding to his district, and will also be supplied with a note of the date of the last case. In this way works the first line of defence of the country against invasion of infectious disease from without. The surgeon of the vessel is a newcomer and is glad to transfer responsibility to the port medical officer.

A starry sky and a full moon give a peaceful setting for the journey ashore. After seeing the patients safely transferred to the ambulance, I send the routine telegrams and superintend the sending-out of the notifications. As an afterthought, I ring up the surgeon at the hospital to inquire after the condition of the "gassed" man. I expect some sarcasm at my expense for sending a "fit" patient, but the houseman is very excited and states that the symptoms had recurred temporarily after the man had had a bath. We surmise that this development is due to solution of some spilt material on his skin.

I now wend my way homeward joyful in the knowledge that the next early morning outing will be for one of my colleagues and that I will be able to make up lost sleep. My day as just described has not been very different from the average. Variety is the spice of life, and port medical officers cannot complain of any lack of it.

CORRESPONDENCE

THE BRITISH HEALTH RESORTS ASSOCIATION

To the Editor of THE LANCET

SIR,—From time to time the medical journals have given publicity to the activities of the British Health Resorts Association, but it is time that its objects and aims should be brought more specifically before the medical profession, because the movement is in essence a medical one, its personnel is predominantly medical, and it must depend very largely for its success on the support given to it by the profession.

Started in response to the appeal of the Government that we should all buy at home those things that can be got at home in preference to going abroad for them, the Association in its earlier days devoted itself to a campaign in favour of "Wintering in England," holding successful conferences at Paignton, Hastings, and Bournemouth. These received wide publicity and were followed by a conference at Llandrindod Wells, and one at Bath in conjunction with other organisations with similar objects. A further conference is being held at Leamington Spa on April 29th at which eminent medical authorities will discuss the uses of the spas in various forms of disease, and it is hoped in September to meet at Scarborough in conjunction with the Yorkshire branch of the Society of Medical Officers of Health. As a result of the encouragement received, the Association was incorporated in August last as a company limited by guarantee (that is, it cannot make any profits) and with widened aims.

It will be sufficient here to condense the objects of the Association into the statement that it is its aim, by various means, so to develop and organise the natural health resources of this country as to put them at least on a level with those on the continent. We have no ill will to the latter—indeed we hope to induce many continental visitors to come in search of health to our resorts, of whose existence they seem hardly aware at present. We recognise that it is the duty of the doctor to advise his patient to go wherever the doctor thinks he will get the most good. We know, however, that in recent years our health resorts have spent a great deal of money in bringing themselves up to date, not only as regards provision for balneology, thalassotherapy, and physiotherapy, but as regards amusements and general amenities. And yet it is true to say that by reason of the better organisation and advertisement of foreign resorts many of them are better known to the doctors of this country than are our own.

The Association proposes to establish a firm medical basis for the claims of our home resorts. It has adopted and published as its official handbook ("British Spas and Seaside Resorts") the valuable information collected for many years by Dr. Fortescue Fox and published as part of Churchill's Medical Directory. This information will be scrutinised and elaborated by means, first, of the help of the medical profession in each of the resorts, and secondly by our medical advisory committee, on which will be found the names of many of the men best known to the profession for their interest in climatology, balneology, and physiotherapy. The Royal College of Physicians of London, the Royal College of Surgeons of England, the British Medical Association, the spa practitioners group of that Association, the Society of Medical Officers of Health, and the British Spas Federation, have each nominated a member of this committee. The information thus obtained will be placed at the disposal of the medical profession, so that in future every doctor in advising his patients as to choice of a health resort will be able to obtain authoritative and impartial information.

Through its conferences and the promulgation of its literature, and by other means, the Association hopes to influence the growing interest in natural methods of prevention and treatment of disease, and thus to help those health resorts in which this country is so rich. It is believed that there are few, if any, forms of physical treatment which could not be provided in this country, and, with a greater interest on the part of the profession followed by an increased clientele at our home resorts, it should be possible before long to place their health-giving virtues, hitherto often regarded as the preserve of the rich, at the disposal of every class of the community.

At its inaugural luncheon in November last the Association had messages of encouragement on patriotic grounds from H.R.H. the Duke of Connaught and the Prime Minister. On these grounds, as well as those of professional interest, we appeal for the moral and financial support of the medical profession. They can help us by influencing their local authorities to subscribe to our funds, and by subscribing themselves. It is obvious that if the movement is successful, all who are concerned in the prosperity of our health resorts will benefit—the doctors not least. If this financial support is not forthcoming soon, the movement must be discontinued and is not likely to be revived again in our generation.

The subscription to the Association is one guinea a year; life membership £10. Inquiries will be welcomed by the general secretary at 199, Piccadilly, London.—We are, Sir, yours faithfully,

(Signed) MESTON,
Chairman of Council.
R. H. ELLIOT,
Chairman of Executive.
W. BYAM,
Chairman of Medical Advisory Committee.
ALFRED COX,
General Secretary.

April 21st, 1933.

*** A leading article on the work of the Association appeared in our issue of April 8th.—ED. L.

A TREATMENT FOR CONSTIPATION

To the Editor of THE LANCET

SIR,—Patients with constipation declare they do not void their bowel contents frequently enough. As to what constitutes "frequently enough," there seems to be no agreement. The greatest enthusiasts of rectal activity advocate a motion after each meal. Any longer interval is labelled constipation, to which they ascribe all ills. The majority of people, less ambitious, are satisfied with one action daily. Less than this is, to them, constipation, and must be guarded against at all costs. On the other hand, there are many people whose rhythm is once in three days, or even once a week, who yet appear perfectly healthy. How is this to be reconciled with the equally undoubted fact that so many patients suffer intensely on account of their constipation?

It is natural that the average person should accept the views of his age, and to-day the views on constipation are vigorous and outspoken, though incorrect. Graphic advertisements depict the terror and misery attendant on colonic sloth, and doctors write popular articles in which the magic words "clogging the

tissues" convey a terrible message of fear. This tends to arouse an attitude towards food similar to that towards travel of certain tourists whose sole object in getting to a place seems to be that of leaving it. Thus there is a large body of people who regard food purely from the point of view of its mobility, and select their foods from those they credit with a sufficient intestinal rapidity, rejecting and even learning to dislike other foods because they are "constipating." The question of taste and natural enjoyment is obscured and thrust into the background, and is replaced by fear and the index of intestinal motion.

It seems to me that the essential in the treatment of a patient with constipation is to relieve him of fear, and this naturally depends largely on the confidence of the physician. If the latter is himself riddled with anxiety—if he believes that constipation is responsible for headaches, lassitude, auto-intoxication, sluggish liver, and all the rest of the superstitions of the rectally pre-occupied—obviously he cannot relieve the fears of his patient. He can prescribe intestinal lubricants, cathartics, irritants, or enemata; but such treatment not only does not cure the patient, it fixes his fears.

My object in writing this letter is to draw attention to the theories and practice of Dr. Georg Groddeck, of Baden Baden. These originated when he read an account of a man who deliberately induced constipation in himself, and was in the habit of holding back his fæces for three weeks because the resulting tension and its eventual relief gave him pleasure. This man not only lived to a ripe old age, but appeared to maintain perfect health, and Dr. Groddeck was led not merely to the idea of a psychological motivation (unconscious as a rule, of course), but also to question the evil effects usually attributed to intestinal stasis. His findings have been summarised in a paper published in translation in the *Medical World* of March 18th and 25th, 1932.

During a stay in Baden Baden I studied and assisted Dr. Groddeck, and was able personally to observe several constipation patients undergo his treatment—always with success. In no case was there any untoward symptom during treatment, in spite of the fact that the patient, at the beginning, would have no bowel action until six, ten, or even as long as 20 days had elapsed. I have treated a dozen cases myself, with the same result. The age of the patients has varied from 20 to 60, and the length of treatment from a few days to two or three months. The usual period is four to eight weeks. Treatment should be given daily, but has proved successful even when circumstances have prevented me from seeing the patient more than two or three times a week. It consists in a combination of dieting and massage, the *diet* being regulated as follows:—

First week.—Small three-hourly meals of meat, fish, cheese, and eggs. Small quantity of bread or toast and butter. Total daily fluid, half a litre. No vegetables and no fruit.

Second week.—As above, plus vegetables and fruit.

Third week.—As above, plus normal fluid intake.

This régime is not absolutely rigid, but can be altered to suit individual requirements.

The *massage* consists of a vigorous pressure on and rolling of the sigmoid colon beneath the fingers, pressure on the splenic flexure with the thumb, deep pressure and kneading with the fists of the upper recti (transverse colon). This can be done once or twice daily. In addition, the patient is forbidden to attempt evacuation until the desire for it is persistent and uncontrollable, and he is forbidden to strain.

The bowel has an innate capacity for carrying out its function effectively. If one has the courage to leave it alone, it will do its work unaided and very efficiently. Massage is a stimulus to the bowel to wake up and do its job. The bowel, like all living matter, has organic memory—in other words, it has the capacity of habit formation. Consequently after a shorter or longer period of purgative taking, it prefers to sit back and await its accustomed stimulus before it will act. When the purge is omitted and its place taken by massage, it finally gets tired of waiting, and resumes its own natural rhythm.—I am, Sir, yours faithfully,

MORRIS ROBB, M.B., D.P.M.

Grosvenor-street, W., April 24th, 1933.

*** The writer's belief in the clinical success justifies publication, but support is required from the experience of others. On wider trial the varieties of a protean symptom which get benefit from the treatment may be suggested, and the permanence of relief.—ED. L.

SYMPTOMS OF ADDISON'S DISEASE IN THE COURSE OF PULMONARY CARCINOMA

To the Editor of THE LANCET

SIR,—The interest of the two cases recorded by Poynton, Payling Wright, and Laurent in your issue of April 8th lies chiefly in their having found symptoms of Addison's disease in suprarenal carcinoma, especially in the case where there was pigmentation of the skin. But I would not admit without discussion that the suprarenal localisations can fairly be called a consequence of the pulmonary carcinoma; indeed, I would suggest that the primary growth was in the suprarenals. In the necroscopical description appearing in the paper no hint is given as to the condition of the periaortic lymph glands, and these are the tributaries of the suprarenal lymphatic vessels. Besides, it must be pointed out that in both cases the carcinoma was localised in the left suprarenal, whose lymphatic vessels run not only to the periaortic lymph glands, but also to the posterior mediastinal, and thence to the peritracheobronchial. The histological examination, which revealed, both in the lungs and suprarenals, an adenocarcinoma in the first case, and squamous carcinoma cells in the second, provides no proof that the pulmonary localisation was primary, for many cases of suprarenal neoplasm of this type have been described (Lecène and Wolfromm, Meyer and Frumess, &c.). I take part in the discussion of this chapter of pathology because during the last few years I have examined at autopsy six cases of suprarenal carcinoma, which were the subject of a communication that I made to the Medical and Surgical Society in Treviso at its meeting on April 7th. As in my cases there were three men and three women from 46 to 60 years of age, in whom a clinical diagnosis of neoplastic suprarenal localisation had not been made—though in two cases there was a bilateral invasion of the suprarenals—and they included two with a cerebral metastasis, I was able in all of them to follow exactly and surely the neoplastic invasion from the suprarenals of the periaortic, the mediastinal, and the peritracheobronchial lymph glands. In four cases the growth was a solid alveolar carcinoma, and in two it was an adenocarcinoma. In view of the regularity and uniformity of my findings—and not withstanding the clinical symptoms found by Dr. Poynton and his colleagues (in my cases only the asthenia and decay were constant)—I think I can oppose their theory that the

lesion in the lung was primary. It should, I think, be regarded as secondary to the suprarenal neoplasia.

I am, Sir, yours faithfully,

Treviso, April 19th, 1933. MENENIO BORTOLOZZI.

ALUM-TOXOID IN DIPHTHERIA PROPHYLAXIS

To the Editor of THE LANCET

SIR,—I have read with great interest in your issue of April 15th the paper by Dr. J. C. Saunders on the Reactions with Alum-toxoid in Diphtheria Prophylaxis. In March, 1931, I used alum-toxoid in 34 children, and in a few cases an annoying induration resulted at the site of inoculation. In one of the cases there was no local or general reaction immediately following the inoculation, but a few days later a localised induration was palpable, and on the sixth day a small abscess about the size of a hazel-nut formed. This was apparently a sterile abscess, as on culturing the pus evacuated no growth was obtained. The abscess healed up completely in five days.

This occurrence prejudiced me against the use of alum-toxoid as a diphtheria immunisation agent, since, however potent its immunising properties may be, abscess formation resulting from its injection is extremely undesirable in any prophylactic. I had one abscess in 34 cases. (Dr. Saunders had four abscesses in 579 cases, or 1 in 145, and all the trouble he experienced was with batch B6707.) This abscess resulted from a 0·3 c.cm. injection of B6539, and in several cases this batch gave rise to definite induration. With B6217 I encountered no reactions of note. I did not use batches B6219 and B6707.

With toxoid-antitoxin the immunising potency is not so high, and the attainment of the Schick-negative state is not so rapid, but the comparative absence of reaction, especially in children, makes it for the present the more acceptable prophylactic for general use, though an—as yet limited but satisfactory—experience of formol toxoid leads me to believe that it may in the future supersede toxoid-antitoxin as the prophylactic of choice.

I am, Sir, yours faithfully,

GEORGE CHESNEY,
Assistant Medical Officer of Health, Poole.

April 19th, 1933.

A WARNING

To the Editor of THE LANCET

SIR,—I should be glad if you could publish in your columns a warning notice, with a description, of a woman who has been impersonating me recently, describing herself as Dr. Edith Abbott, medical officer of health in the L.C.C. education service.

She is 5 ft. 6 in. in height; usually wears a black tailor-made coat and skirt in strict masculine style, and has a Henry Heath grey felt hat with a feather in the side. She wears pince-nez, has fair bobbed hair, and a thin face. Usually wears a shirt blouse and red tie, grey stockings, and black patent shoes. She has been frequenting the Chelsea and the West Central area.

I am, Sir, yours faithfully,

(Mrs.) EDITH HARRIS, M.B., D.P.H.
(née Edith Abbott).

Bigwood-court, N.W., April 25th, 1933.

PANEL AND CONTRACT PRACTICE

A Little Grumbling All Round

AN Englishman is said only to be quite happy when he is grumbling, and if that is true there must be a good deal of happiness among the officers of friendly societies and others engaged with medical benefit. At Kettering the Provincial Grand Master of the Oddfellows recently asked: "Are we getting full value for the money which is being expended on medical benefit?" From the start of the Act up to 1931, he said, £154,000,000 had been spent on medical benefit, over £164,000,000 on sickness benefit, £67,000,000 on disablement benefit, and nearly £30,000,000 on maternity benefit. With additional benefits the grand total came to £436,000,000, quite apart from the vast sums spent by municipalities. After such colossal expenditure it was reasonable to expect an improvement in the health of the people; that was not so, because nowadays he was informed that 50 per cent. of recruits were rejected for Army service. (But has the standard of recruiting not gone up?) The decline in physical standard might, he thought, be averted (1) by staffing research laboratories with the best brains; (2) by giving children from 14–16 free medical attendance; (3) by ensuring that schools should be brought up to the standard of modern sanitary science, and be staffed with health lecturers. To pay for all this he would take a shilling off the doctor's capitation fee and so recoup the insurance fund for the raid made upon it by Mr. Churchill in 1926, and he would also dock the approved societies one-tenth of their accrued surplus. He does not seem to realise that the standard of knowledge required from the panel doctor to-day is much higher than it was at the starting of the Act, and that the public, especially the young people, are far more apprehensive of their health than they were.

On the whole the grievance of the approved societies against the panel system is not so vocal as it used to be before the report of the Royal Commission some years ago; but complaints by doctors are becoming more definite than they were. At a recent medical society's dinner complaint after complaint was uttered against the regulations, beginning with the letter sent by a regional medical officer to one of its members on his keeping of records. This letter pointed out mildly that his statistics were nearly half the local average, so that presumably he was not keeping his records properly. It went on to add pleasantly that this particular doctor's writing was good. This gave great offence. Next came the complaint of the man who had accepted on his panel the wife of the owner of some big house where he was in the habit of charging a visiting fee of at least 7*s*. This was monstrous. (But why did he accept her?) Then came the complaint of the doctor who had been for some time attending a patient, supplying drugs and dressings, only to find, when the bill was sent in, that she was an insured person who applied to the insurance committee for its withdrawal. Clause VII. (3) had not worked in his favour, but he had been allowed 4*s*. 6*d*. for dressings. The futility of keeping records of work done was emphasised by many, but one member derived comfort from the opinion of a regional medical officer that the best record-keepers were not the best doctors. Another complaint related to fees for giving dental anæsthetics. It was stated that only 7*s*. 6*d*. was paid for gas when any number of teeth from one

jaw only were extracted, whereas 10*s.* 6*d.* was allowed for one tooth from the upper and one tooth from the lower. In point of fact, dental gas is quite outside the Act, and the fee charged by a doctor for its administration is his own concern. Approved societies make payments towards this cost for the benefit of their members upon some such scale as indicated, but it does not follow that the doctor need accept these as full discharge. In the supply of glasses for ophthalmic benefit, when the member wants gold frames he must pay the extra cost himself; so in dental benefit, if the member's doctor is a one-guinea man, the member must pay the extra himself.

Some of the grumblers do not seem to have mastered the principles underlying the regulations, or to have realised that the obligations undertaken in their contract with insurance committees have been considered in fixing the capitation rate.

Incapable or Not Incapable: Who Decides?

The West Ham insurance committee had a full dress debate at its last meeting on the rights of insured persons who were declared not to be incapable of work by the regional medical officer, but who were thought by their own doctor to be still unfit. The ruling of the Ministry of Health on this matter is quite definite. "The responsibility of the regional medical staff . . . is advisory only." Apparently procedure differs amongst the approved societies in this regard, just as it does in the certification of pregnancy cases. It is the duty of an insurance practitioner who disagrees with the finding of the regional medical officer to continue to certify his own view of the case. If the regional medical officer states the man "is not incapable," and his doctor still thinks he is incapable, further intermediate certificates should be given. Some practitioners declare the patient off the funds against their own judgment, and some societies stop paying sickness benefit as and from the date of the regional medical officer's decision, notwithstanding the continued issue of certificates of incapacity. The society has to decide whether to pay sickness benefit or not, and the insured person has the right to appeal by arbitration against the society's decision, and to a final court of appeal set up by the Ministry if he be still aggrieved by the arbitration results. The society probably arrives at its decision upon several factors, including the insurance doctor's certificate, the sick visitor's report, the member's previous record, and the report of the regional medical officer. But West Ham felt that insured persons were inadequately informed of their rights in these matters, and they passed a resolution that representation should be made to the Ministry of Health and to the National Association of Insurance Committees for steps to be taken to clarify the position.

PUBLIC HEALTH SERVICES

Lessons of Tuberculosis on Tyneside

THE association of tuberculosis with poverty and its derivatives has long been taken for granted, but social medicine has suffered too long from facile assumptions and conclusions, and it was a wise move on the part of the National Association for the Prevention of Tuberculosis to make exact inquiry into the high mortality from tuberculosis in the Tyneside area when brought to its notice at the annual conference of 1929 in Newcastle. At Sir Robert Philip's suggestion that Tyneside might usefully form the field for an intensive investigation, the first step was taken when Dr. William Brand visited the area and got into touch with the local medical officers of health and tuberculosis officers. The Association then looked for an investigator competent on the clinical aspects of tuberculosis and also equipped with modern statistical methods. Dr. F. C. S. Bradbury, one of the tuberculosis officers of the Lancashire County Council, was seconded for this work and appointed a temporary officer of the Association, commissioner for the Tyneside inquiry. From October, 1930, to December, 1931, he was engaged in close observation of conditions in the two Tyneside districts of Jarrow and Blaydon, Jarrow being selected because of its high mortality from tuberculosis, Blaydon in a certain measure as a control. The aim was by house-to-house visitation to collect data sufficiently numerous to enable the interaction of the various factors to be at least partially separated, and since December, 1931, Dr. Bradbury has been engaged in the examination of the data, aided by Mr. A. Bradford Hill, D.Sc., of the statistical staff of the Medical Research Council, although the responsibility for the conclusions rests with Dr. Bradbury alone. His report has just been published under the title "Causal Factors in Tuberculosis" (N.A.P.T., Tavistock House North, London, W.C.1. Pp. 126. 2*s.* post free).

As was inevitable, the Tyneside figures show a marked statistical association of poverty with tuberculosis, the chief element of the association being that poverty causes tuberculosis rather than that tuberculosis leads to poverty. The principal means by which poverty is found to cause tuberculosis are the overcrowding and under-nourishment which are the chief distinguishing features between poor and non-poor families in the areas studied. These findings lead to the considered opinion that poverty is to be regarded as a factor of prime importance in the causation of a high incidence of tuberculosis in Jarrow. Further, there was in the areas studied a definite statistical association between overcrowding and tuberculosis, evidence being submitted to show that overcrowding is a cause and not simply an accompaniment or result of tuberculosis. In Jarrow the evil of overcrowding is accentuated by a large proportion of tenement dwellings which have few and small rooms, and are often of unsatisfactory design.

The association of poverty with under-nourishment Dr. Bradbury admits to be more difficult of statistical proof on account of the absence of an accepted or easily framed standard, the association being necessarily based upon indirect information rather than upon evidence obtained and verified by the observer. Under-nourishment should, he prefers to say, be regarded as an important predisposing cause of sickness in general, and particularly of tuberculosis. The foodstuffs especially studied were meat, bread, butter, and fresh milk, the last-named being regarded as of greater importance than the others as a preventive of tuberculosis.

The Irish element in the population of Jarrow was examined and evidence produced to show that not only is tuberculosis relatively more common in the Irish than English families in the area, but that this greater prevalence in the Irish is not entirely explicable by their habits of life or inferior environ-

mental conditions. While admittedly it is necessary to exclude a great many other possible explanations before admitting any inborn racial difference, Dr. Bradbury does conclude that an important factor of the high incidence of tuberculosis in Jarrow is the racial susceptibility of the Irish who form at least one-seventh of the population.

Other possible contributory conditions were studied without obtaining definite evidence of their importance as causes of tuberculosis—such as insanitation, bad ventilation, dirt, damp, house-to-tenant infection, and the local peculiarity of marriage of women at an unusually early age. Their association with tuberculosis can, it seems, be adequately explained on other grounds. But the investigation brought to light the important fact that the supervision exercised by maternity and child welfare clinics is definitely a factor of importance in the suppression of tuberculosis—an observation of great importance, since this supervision is available to all without cost.

The peculiarly rapid type of pulmonary tuberculosis met with in the area is attributed to the relatively high proportion of susceptible persons and the unfavourable housing conditions which prevent the proper care of patients before or after sanatorium treatment. Unfavourable environmental conditions in general are found to be an important cause of the high incidence of pulmonary tuberculosis in children. But no satisfactory explanation has been found for the almost unique age-group distribution of pulmonary tuberculosis among males in Jarrow, the maximum mortality occurring in the 15–25 group instead of in the 45–65 group as in most other districts. Partial explanations may be found in the relatively high proportion of young adult males in Irish families and their strenuous and irregular employment. An excessive incidence of abdominal tuberculosis was noted in Jarrow, more likely of human than of bovine source owing to the very limited use of fresh milk in the area.

No attempt has been made to trace an association between the incidence of tuberculosis and the prevailing types of occupation in the two areas, the chief occupation for males in Blaydon being mining, and in Jarrow the shipyards; for the conditions in the two towns are in other respects so different. Blaydon is obviously superior to Jarrow in the quality of its housing and in the prosperity of its people. Moreover it consists of numerous urban communities separated by large tracts of open country, much of the area being at a considerable altitude and sheltered from prevailing winds.

It was one of the objects of the inquiry to reach conclusions of practical value, and the chief of these are very briefly as follows:—

(1) The building and use of tenement dwellings should be strictly controlled.

(2) Poor families should be informed how to provide adequate and balanced diets at the cheapest possible rates.

(3) Fresh milk is a daily necessity in poor families.

(4) Facilities provided by maternity and child welfare clinics should be more widely used.

It was not within the province of the report to suggest measures for the relief of poverty, but it has been shown that collective action can deal with tuberculosis at the source, whereas the ability of the individual to protect himself against the disease is more limited. The Association's policy of active propaganda therefore appears a valuable means of combating the disease. The Tyneside Enquiry Committee in a foreword express a hope that the report may stimulate the organisation of similar intensive investigations in other areas. The Association has on hand a considerable number of surplus cards of the type used in this inquiry and will place them at the disposal of those undertaking similar studies elsewhere.

Cerebro-spinal Fever in the West Riding

For the last two months some 15 cases of cerebro-spinal fever have been reported with regularity each week from the West Riding of Yorkshire, about half of them from a number of semi-rural districts in the Calder and Don valleys. Some real anxiety seems to have arisen about two cases of this fever at present in the Hemsworth isolation hospital, one being from the Hemsworth urban district and the other from the Wakefield rural district. There had been two other cases in the district—one from Upton which proved fatal, and another from Wombwell urban district which recovered during the past month. There appears to have been some difference of opinion regarding the gravity of these cases from an epidemic standpoint, and a local press report referred to an "epidemic of spotted fever" in the Normanton district where during the present year 16 cases, 9 of them fatal, have been admitted to hospital. But such incidence of a disease which is nearly always with us during the winter and early spring in an endemic form cannot fairly be termed an epidemic, and we agree with the opinion expressed by Dr. W. Ross Gardner, at a meeting of the local hospital committee, that there was no need to take a serious view of these cases from an epidemiological point of view. It is not unusual for a few additional cases to occur during the months of April or May, when the seasonal prevalence of the disease is at its maximum intensity. The majority of all recorded epidemics have begun during one of the four months from December to March inclusive, the peak being reached in April or May; from the latter month the incidence declines and there are no more cases after the end of July.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED APRIL 15TH, 1933

Notifications.—The following cases of infectious disease were notified during the week:—Small-pox, 14 (last week 31); scarlet fever, 1905; diphtheria, 680; enteric fever, 29; acute pneumonia (primary or influenzal), 1081; puerperal fever, 42; puerperal pyrexia, 110; cerebro-spinal fever, 39; acute poliomyelitis, 6; acute polio-encephalitis, 3; encephalitis lethargica, 6; dysentery, 10; ophthalmia neonatorum, 79. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on April 18th–19th was as follows: Small-pox, 48 under treatment, 3 under observation (last week 61 and 2 respectively); scarlet fever, 1650; diphtheria, 1632; enteric fever, 13; measles, 341; whooping-cough, 568; puerperal fever, 26 (plus 14 babies); encephalitis lethargica, 232; poliomyelitis, 2; "other diseases," 378. At St. Margaret's Hospital there were 18 babies (plus 9 mothers) with ophthalmia neonatorum.

Deaths.—In 118 great towns, including London, there was no death from small-pox, 2 (0) from enteric fever, 45 (0) from measles, 4 (0) from scarlet fever, 24 (8) from whooping-cough, 20 (4) from diphtheria, 38 (10) from diarrhœa and enteritis under two years, and 62 (6) from influenza. The figures in parentheses are those for London itself.

Hove and Coventry each reported one death from enteric fever. Liverpool reported 6 deaths from influenza; no

other large town more than 2. Seven deaths from measles occurred at Liverpool, 5 at Birkenhead, 4 at West Bromwich; each 3 at Hull, Birmingham, and Nottingham. Liverpool reported 4 deaths from diphtheria.

The number of stillbirths notified during the week was 273 (corresponding to a rate of 48 per 1000 total births), including 47 in London.

OBITUARY

WILLIAM ALEXANDER MACNAUGHTON, M.D. Edin., D.P.H.

Dr. Macnaughton, who died at his home at Stonehaven on April 18th, at the age of 76, was for 39 years medical officer of health for the county of Kincardine. A Perthshire man by birth, he graduated in medicine at Aberdeen in 1878, and was then for a time engaged in private practice in the north of England. In 1890, however, after the passing of the Local Government (Scotland) Act of 1889, he became one of the 16 whole-time medical officers of health appointed by Scottish county councils. In this office he served continuously until 1930, when he retired, partly for reasons of health and partly because the duties of his department were extended under the new Local Government Act. He was an energetic and conscientious public health official, and during his long period of duty gave full satisfaction to the council and to the public which he served. Outside his work he had a literary bent, and with the late Dr. Rutherford Macphail and the late Dr. Donald MacLennan, he was responsible for the foundation of the Caledonian Medical Society, at Valleyfield, Edinburgh, some 53 years ago. His interest in the society never waned, and to the end of his life he remained (with Colonel D. Rorie) the indefatigable editor of the *Caledonian Medical Journal*. This was enriched by many contributions of his own, and the January number contained the concluding instalment of his notes on medical heroes of the 'forty-five. His support of the society was fully appreciated, and at the jubilee celebrations he was presented with a handsome silver bowl, a reproduction of an ancient "quaich," engraved with its crest and suitably inscribed.

Dr. Harry J. Rae, to whom we are indebted for many of these biographical details, writes of Macnaughton that "he was one of the very few men of whom it may be said that he made practically no enemies either in his official capacity or in his private life. His personality endeared him to all with whom he came in contact."

JAMES FRANK HOLLAND, M.D.R.U.I.

THE death in London, on April 13th, of Dr. Holland removes one whose figure was long familiar to all who frequented the Engadine for health or winter sport. Educated at Queen's College, Cork, and St. George's Hospital, London, Dr. Holland took his medical degree in 1879 and went out to the Engadine in the early 'eighties, where he settled at the Kulm Hotel in St. Moritz Dorf, and attended to the medical needs of British visitors, as well as to their desire for healthy sport and recreation. He started the St. Moritz skating association and was himself the leader and pattern of skating, founding a figure-skating school of his own. Later on he built a villa for a sanatorium and started an aid fund for prolonging the stay of invalids who required it. For nearly 30 years he was consular officer in the valley. He retired from practice in 1920.

JAMES RICHAN DREVER, M.B. Glasg., F.R.C.P. Edin.

Dr. Drever, who died in Glasgow on April 7th, had been medical secretary to the British Medical Association in Scotland for a period of 12 years, retiring from the post in November, 1931, on account of ill-health. He was born on the Clyde in 1873, graduated in Arts at Glasgow University, and became a teacher for some years before taking up medicine. He was in fact 33 years of age before obtaining his M.B. Glasg., when he entered on general practice, taking up ear, nose, and throat work in addition as a specialty. After varied activities for the British Medical Association, including membership of the Insurance Acts Committee from 1914, he was appointed to the Scottish Office in September, 1919, when he gave up his other work. Soon after his appointment the new house in Drumsheugh-gardens was acquired for the work of the association, which grew rapidly in many directions. Dr. Drever was naturally a good organiser, with a logical and relevant mind; his counsel and experience were always at the disposal of individual practitioners. He leaves a widow and a son who is a student of medicine.

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE

Surg. Lt.-Comdr. H. H. Fisher to *Frobisher*.
Surg. Lt. F. C. M. Bamford to be Lt.-Comdr.

ROYAL NAVAL VOLUNTEER RESERVE

Surg. Sub-Lt. F. W. Baskerville to be Surg. Lt.

ROYAL ARMY MEDICAL CORPS

RESERVE OF OFFICERS

Lt.-Col. C. E. W. S. Fawcett, having attained the age limit of liability to recall, ceases to belong to the Res. of Off.

TERRITORIAL ARMY

The King has conferred the Territorial Decoration upon the undermentioned Officers: Lt.-Col. H. G. Smeeth (retd.), Maj. R. Thornton (decd.), and Capt. (Qr.-Mr.) A. A. Lippold (retd.).

The King has conferred the Efficiency Decoration upon Lt.-Col. F. R. Harris and Maj. and Bt. Lt.-Col. E. W. Matthews.

RESERVE OF OFFICERS

Lt.-Col. E. H. Cox, having attained the age limit, retires and retains his rank, with permission to wear the prescribed uniform.

Capt. A. F. Comyn, having attained the age limit, relinquishes his commn. and retains his rank.

INDIAN MEDICAL SERVICE

Lt. A. B. Guild to be Capt. (prov.).

ROYAL AIR FORCE

Flight Lt. G. S. Strachan to Central Medical Establishment, and D. A. Wilson to Station Headquarters, Northolt.

Dental Branch.—Flying Officer J. E. Tyrrell is promoted to the rank of Flight Lt.

DEATHS IN THE SERVICES

Major John Henderson Bannigan, R.A.M.C. (retd.), who died at Engerfield Green, at the age of 78, on April 21st, qualified L.R.C.P., L.R.C.S. Edin. in 1879, having studied medicine in Edinburgh, Glasgow, and at Queen's College, Belfast. He received his first commission in 1885, and five years later served with the Zhob Valley Expedition. In 1897 he became Major, with which rank he took part in the operations on the North-West Frontier of India, 1897–98 (medal with clasp). He was also engaged in the South African War, 1899–1902, and was present at the relief of Ladysmith, including the action at Colenso, when he was slightly wounded. He also was engaged in the operations in the Transvaal, east of Pretoria, including the actions at Belfast and Lyndenberg (Queen's medal with 4 clasps, and King's medal with 2 clasps). He retired in 1905, but was re-employed during the Great War.

MEDICAL NEWS

University of Oxford

In a congregation held on April 8th the following degree was conferred :—

B.M.—G. G. M. Edelsten, H. A. Treble, and H. J. B. Atkins.

May Readership in Medicine.—A legacy, of about £11,100, bequeathed to the university by the late Miss Alice Mary May, has made it possible to establish a fellowship, which will be awarded for knowledge and proficiency in the higher branches of medical and surgical research. The Fellow, who will be styled the May Reader in Medicine, will conduct research and assist in the preparation of candidates for the degree of Bachelor of Medicine. He will be expected to spend at least six months of each academic year within the university, and will receive a stipend of approximately £400 per year. The readership will be tenable with either another fellowship or demonstratorship, but not with a readership or lectureship. The Fellow must be a British subject, and he must be a Bachelor of Medicine of Oxford, or must hold an equivalent degree at some other British university, or be M.R.C.P. Lond. or F.R.C.S. Eng. The first Fellow will be elected to hold office until the beginning of the Michaelmas term, 1935, but succeeding Fellows will be elected for periods of seven years.

University of Glasgow

On April 22nd the following degrees were conferred :—

D.Sc.—R. C. Garry, M.B.

M.D.—With high commendation : W. A. Burnett, Thomas Gilchrist, Peter Hutchison, and Albert Sharman. With commendation : S. M. Allan, M. J. Bastible, J. C. Hendrie, T. M. Hunter, and A. B. Smith. Ordinary degree : Thomas Dymock, C. M. Fleming, J. A. Imrie, E. J. MacIntyre, and J. W. Wilson.

B.Sc. (with First-class Honours in Pathology).—A. C. Lendrum, M.B.

M.B., Ch.B.—With Honours : Gilbert Forbes. With commendation : Henry Wapshaw. Ordinary degrees : Mabel S. Ainslie, R. C. Anderson, P. B. Angus, A. K. Boyle, J. A. Brown, William Brown, Thomas Bryson, Robert Calderwood, A. A. Cameron, J. C. Campbell, James Cordiner, D. F. Craig, D. C. Dewar, I. N. Dunn, D. B. Faulds, James Fleming, Robert Gibson, A. M. Goldie, R. K. Grossart, Allan Guthrie, Lilly C. Hall, J. C. Henderson, Isaac Hoppenstein, J. S. Hutchison, R. F. Jamieson, S. R. Jamieson, Alice K. Killin, Walter Livingstone, P. J. McAloon, J. E. McClemont, N. M. Macdonald, R. G. MacGregor, James McIntosh, John MacKenna, D. A. MacKinnon, Mary H. McLaren, E. R. McLaughlin, Malcolm McLellan, J. L. McLetchie, D. J. N. McNab, Robert Neilson, Mary C. Orr, Alexander Russell, H. R. Shields, J. A. Sweeney, J. G. Thomson, James Watson, John Watson, J. P. Williamson, Jean Wilson, and Agnes B. B. Wright.

British Institute of Philosophy

Six lectures on Contemporary Movements in Psychology will be given by Prof. F. Aveling, at 5.45 P.M. on Wednesdays, from May 3rd to June 7th, at University Hall, 14, Gordon-square, London, W.C. Particulars may be had from the director of studies, 14, Gordon-square, W.C.1.

Research on Maternal Morbidity

The council of the British Medical Association is prepared to consider an award of the Katherine Bishop Harman prize, of the value of £75, in the year 1934. The purpose of the prize is the encouragement of study and research directed to diminishing the risks to health and life that arise in pregnancy and childbearing. Any medical practitioner registered in the British Empire is eligible to compete, and particulars may be had from the medical secretary at B.M.A. House, Tavistock-square, London, W.C.1. Essays must be submitted in proper form not later than Dec. 31st, 1933.

Research Fellowships in Tuberculosis

The Dorothy Temple Cross research fellowships in tuberculosis for the academic year 1933–34 will shortly be awarded by the Medical Research Council. Their value will be not less than £350, exclusive of allowances. The object of the fellowships is to give special opportunities for study and research to persons "intending to devote themselves to the advancement by teaching or research of curative or preventive treatment of tuberculosis in all or any of its forms." Candidates must be British subjects, and must possess suitable medical, veterinary, or scientific qualifications. The awards will preferably be made to those who wish to make their studies or inquiries outside the borders of Great Britain. As a rule they will be for one year, but in special cases they may be renewed. It may also be possible to award a senior fellowship of considerably greater value to a specially well-qualified candidate. Further particulars and forms of application are obtainable from the secretary, Medical Research Council, 38, Old Queen-street, Westminster, London, S.W.1, with whom applications must be lodged before June 1st.

University of London Medical Graduates' Society

The annual dinner of this society will be held at the Langham Hotel, London, on Tuesday, May 9th.

Royal Medico-Psychological Association

On Wednesday, May 17th, at 3 P.M., Dr. Adolf Meyer will deliver the fourteenth Maudsley lecture in the Barnes Hall of the Royal Society of Medicine, 1, Wimpole-street, London, W. Dr. Meyer, who is psychiatrist-in-chief at the Phipps clinic of the Johns Hopkins Hospital, Baltimore, will take as his subject Psychiatry and Mental Hygiene. Admission is without ticket.

Central Council for the Care of Cripples

The report for 1932 states that a great advance has been made both in the extension of existing work and in the planning of new schemes. Many new buildings have been completed and others are under consideration. Vocational training is receiving increased attention and new schemes in various parts of the country are well on their way towards realisation. Applications were received from 265 new cases, and a total of 402 were dealt with. It is hoped to organise the third International Exhibition of Cripples' Work in some town in the North of England next autumn.

Visit to Italian Health Resorts

A party of medical men will leave this country in September to join a tour of about a fortnight to spas and other resorts in the Dolomites, on the Lake of Garda, in the Apennines, and elsewhere in Italy. The tour will start at Venice and finish at Rome, and the group will be in charge of an English-speaking Italian doctor. There will be no night travel in Italy, and a special train composed of first-class coaches will be used throughout. Members of the party may take with them their wife, son, or daughter ; and at the end of the tour they will be able to visit other parts of Italy at half the usual railway fare. The manager of the Italian State Tourist Department (E.N.I.T.), Major W. Stormont, 16, Waterloo-place, London, S.W.1, will furnish details of the arrangements.

Fellowship of Medicine and Post-Graduate Medical Association

There will be a week-end course in cardiology at the City of London Hospital, Victoria Park, on Saturday and Sunday, May 6th and 7th. An all-day course in urology, for advanced post-graduates, will be given at St. Peter's Hospital from May 8th to 20th, comprising demonstrations, lectures, and operations. It is limited to eight. An intensive week-end course of instruction on Rheumatic Disorders and Applied Hydrotherapy will be given at the Royal Mineral Water Hospital, Bath, on May 13th and 14th. An all-day course in diseases of children will be given at the Queen's Hospital, Bethnal Green, from May 15th to 27th. Forthcoming courses include one on gynæcology from May 22nd to June 3rd ; a week-end course on obstetrics on May 20th and 21st ; one on venereal disease from May 22nd to June 17th ; and an evening clinical course from May 23rd to June 16th (on Tuesdays and Thursdays). Two lectures on cataract extraction will be given by Lieut.-Colonel R. H. Elliot on Wednesdays, May 24th and 31st. Further particulars may be had from the Secretary of the Fellowship, 1, Wimpole-street, W.1.

The Index Veterinarius

It has now been decided that the Imperial Bureau of Animal Health shall publish an Index Veterinarius, and the first number, covering the indexing done at the Bureau during the first quarter of 1933, will be issued some time during the summer. It will be a complete index to publications relating to veterinary research, public health, administration, and education. About 10,000 references will be indexed each year, each reference being suitably cross-indexed alphabetically both under the names of authors and subjects ; with cross-indexing there will be about 50,000 insertions in a volume. The annual volume, which will be in crown quarto size, will run to about 1600 pages, and a number, consisting of about 400 pages, will be issued each quarter. It will be prepared on a Gestetner duplicator, the sheets being printed on one side only. Each quarterly number will be glued and stitched and will be bound with a printed stiff paper cover. A specimen page will be sent on application. The price is to be £4 per volume (four quarterly issues) including postage. Orders should be sent to the Imperial Bureau of Animal Health, Veterinary Laboratory, Ministry of Agriculture and Fisheries, Weybridge, Surrey.

Queen's University, Belfast

Mr. P. T. Crymble, surgeon to the Royal Victoria Hospital and the Hospital for Sick Children, Belfast, has been appointed to the chair of surgery in succession to Prof. Andrew Fullerton.

Naval Medical Compassionate Fund

At the quarterly meeting of the directors of this fund, held on April 19th, with Surgeon Vice-Admiral R. St. G. S. Bond, medical director-general of the Navy, in the chair, the sum of £225 was distributed among the several applicants.

Charing Cross Hospital

Last year closed with a credit balance of £1600; the income was £69,274. By what Mr. George Verity, the chairman, described as "a miracle," the remaining debt of £12,000 on the nurses' hostel has been paid off, and it is now intended to complete the building. Every year the institute of pathology deals with thousands of cases sent to it for diagnosis, and a further £500 is needed to carry it safely through the present year.

Hospital Ambulances

The London County Council proposes to spend £42,000 upon the creation at Wandsworth of a depôt for the repair of its hospital ambulances, which are now approaching 350 in number. Hitherto these vehicles have been repaired at a disused small-pox hospital at Fulham inherited from the Metropolitan Asylums Board.—According to evidence given at a "sworn inquiry" into specific complaints of Roscommon County Home, the Roscommon board of health possessed no ambulance from the middle of May, 1932, until the middle of March this year, its vehicle having been wrecked in a collision. The matron of the home said that hackney motors were then hired by contract at 4*d.* a mile, and that she knew of no special precautions having been taken by the board to have the cars disinfected immediately after the conveyance of fever patients. Cars were disinfected when the drivers asked to have it done. Dr. C. J. Kelly, the medical officer, said that he had repeatedly recommended that there should be two ambulances, one for infectious and one for surgical cases, and Dr. John McCormack, the inspector before whom the inquiry was held, described the situation as "shocking."

Mr. B. W. Rycroft has been awarded the Middlemore prize for 1933 by the council of the British Medical Association for his essay on the treatment of glaucoma.

Hospital Air Pageants

British Hospitals' Air Pageants have already handed over to various institutions £500 derived from the flights which began on April 8th.

Diphtheria at Dewsbury

In his report for 1932 Dr. G. H. L. Hammerton, medical superintendent of the Mitchell Leathes Isolation Hospital, Dewsbury, states that the year was the busiest since the opening of the institution, both in the number of admissions and the severity of the cases. There were 650 admissions, an increase of 197. There were 178 more scarlet fever cases and 25 more diphtheria cases. Diphtheria, indeed, shows no decrease either in numbers or severity, 218 cases being admitted against 193, with 26 deaths against 22. There were 49 cases of post-diphtheritic paralysis. A few cases of chicken-pox which broke out in the scarlet fever ward were sent to the small-pox hospital. The average stay was reduced from about 49 days to about 32.

University of Aberdeen

The annual meeting of the general council of the University, held on April 15th, disapproved of the ordinance of the University court for the abolition of the chair of forensic medicine. The court had decided that, the income from the endowment (£1000) left in 1857 by Alexander Henderson being totally insufficient, the upkeep of the chair could be continued only at the cost of restricting the development of other branches of the medical faculty. It was suggested that the duties should be discharged by a lecturer. Dr. A. Greig Anderson, in opposition to the proposal, said that the medical profession regretted that the University should contemplate reducing the number of chairs in the medical faculty rather than increasing them. The chair had been in existence nearly 70 years and had been held by two distinguished professors, Ogston and Matthew Hay. An appeal in the same sense was submitted to the council by seven families of direct descent from Alexander Henderson, five of them being of French or German nationality. The decision to continue the existence of the chair was reached by a large majority.

PARLIAMENTARY INTELLIGENCE

NOTES ON CURRENT TOPICS

Reassembly after Easter

BOTH Houses of Parliament reassembled on Tuesday, April 25th, after the Easter recess.

The Budget

In the House of Commons on April 25th, Mr. NEVILLE CHAMBERLAIN, Chancellor of the Exchequer, in making his annual budget statement, said that having estimated for a surplus of £800,000 he found himself with a deficit in round figures of £32,000,000. This deficit would be made good by borrowing. The deficit included the payment on the American Debt of £28·9 millions, without which the deficit would have been only £3·3 millions. The anticipated revenue was £766,800,000; the amount actually received was £744,791,000, leaving a shortage of just over £22,000,000. The Customs and Excise revenue was estimated at £300,000,000; the amount received was £288,135,000, showing a deficit of nearly £12,000,000. The inland revenue yielded £411,519,000, a drop of £15,500,000 on the estimate. The estimate of sur-tax at £66,000,000, which was £11,000,000 lower than the yield of the year before, proved too high by £5,000,000. Instead of £260,000,000 from income-tax they had received only £252,000,000. No less than 12,000 people who were liable to sur-tax in 1931 fell below the point for liability in 1932. The deficiency of £8,000,000 in income-tax was due mainly to the factor of collection of arrears which fell short of the estimate by £7,000,000.

On the expenditure side the original estimates of £447,204,000 for Supply Services had been increased by supplementary estimates amounting to £21,614,000. Of this, £18,000,000 was due to extra charge for unemployment. There had been savings of £4,500,000 on unemployment and £1,500,000 on the Road Fund. Economies among a large number of departments brought a total saving on the enlarged estimate to £10,500,000. The net total expenditure amounted to £458,750,000. The purchasing and saving power of the people had been maintained to a remarkable degree. Deposits in the Post Office Saving's Bank rose during the year by £16,000,000, and in the Trustee Saving's Banks by £11,750,000.

The estimated total ordinary expenditure for 1933–34 was £697,486,000, or a reduction of £88,000,000 compared with the estimates of two years ago. The total estimate of revenue for 1933–34 on the existing basis of taxation was £712,730,000. The duty on light oils (mainly petrol) now 8*d.* per gallon would not be increased. There would be substantial increases on the taxation of heavier goods vehicles as from Jan. 1st next. The result of various changes would raise the revenue to £714,777,000. Deducting the estimated expenditure of £697,486,000 there was left a net excess of revenue over current expenditure of £17,291,000, without allowing anything for Sinking Fund or Debt Redemption. As from April 26th the duty on beer would be 24*s.* per bulk barrel of a gravity of 1027° and less, and 2*s.* per degree over that gravity. The effect would be to reduce the retail price of beer by 1*d.* per pint, and at the same time to improve its quality. This would entail a loss in revenue this year of £14,000,000, thus reducing the free balance to £3,291,000. He did not propose to unbalance the budget to reduce income-tax. A reduction of income-tax this year by 1*s.* would cost £50,000,000. Since income-tax was based on the profits of the year preceding the assessment, it would be necessary, in order to obtain an extra £50,000,000 in 1934 and £100,000,000

in 1935, that profits of 1933 should be increased by £250,000,000, and of 1934 by £500,000,000. He proposed, however, to reverse the procedure of 1931 and revert to the equal half-yearly instalment system so that only three-quarters of Schedules B, D, and E tax would be required of the taxpayer in four quarters of this year. This would involve a loss of revenue of £12,000,000, not a genuine loss, but a postponement. The final balance of the budget showed an estimated surplus of £1,291,000.

Housing and Slum Clearance

In the House of Lords the Housing (Financial Provisions) Bill was considered on report.

The Marquess of SALISBURY moved an amendment to omit paragraph (*b*) of Clause 2, which provides that any proposals made to the Minister of Health under the section shall make provision for securing that except in so far as the Minister may in any particular case dispense with the requirements of this paragraph, the number of houses in relation to the area occupied, or intended to be occupied by and in connexion with them, will not exceed the rate of 12 to the acre. The paragraph also provides that except where otherwise approved by the Minister on the recommendation of the local authority, every house to which the section applies shall be provided with a fixed bath. He said that the whole object of the Bill was the erection of cheap houses for the working classes. He was delighted with the Bill and thought it admirable until he found that the Government were not prepared to allow the building societies a free hand. The provision which he was moving to omit would not make working-class houses cheaper, but dearer. That appeared to be extraordinarily inconsistent with the policy of the Bill. It would interfere also with the re-housing of tenants who were living under slum conditions. It was not his purpose to say that houses must be erected at the rate of more than 12 to the acre, or to say that they should be erected without a bath, but he contended that in these matters the building societies should be left a free hand.

Viscount BUCKMASTER said that unless building societies had changed since he had direct knowledge of their operations, they were not bodies experienced in the building of houses. They merely advanced money to persons who proposed to build houses or who proposed to buy houses that had already been built, and provided for the repayment of the money lent in stated instalments. That required no knowledge or control over building schemes. If that were true then this paragraph which Lord Salisbury proposed to omit from the Bill did not interfere with the building societies; it merely provided that the facilities to be given under the clause should only be provided in cases where a particular class of house was to be built, subject to the over-riding power of the Minister of Health. As to the question of baths, he held that they were even more necessary for health reasons in working-class homes than in the houses of other classes of the community. Strict, rigid, and even drastic economy was a vital necessity of this country at this time, but it was not the least use to economise to such an extent that the poorer people of the country were kept in conditions of dirt, uncleanliness, and overcrowding. He hoped that the amendment would not be accepted.

The Earl of LISTOWEL, speaking for the Opposition, said that they viewed the amendment with the gravest concern as it would deprive the houses which would be erected under this Bill in years to come, of certain amenities which they considered vital.

Viscount GAGE (Lord-in-Waiting), replying for the Government, said that he must resist the amendment. The provisions as regards baths and the density of houses per acre originated in the Wheatley Housing Act of 1924, and since that time no subsidy had been given unless houses conformed to those provisions. In the view of the Ministry of Health the provision as to density per acre would not appreciably affect the cost of houses erected on the sites which would be selected.

On a division the amendment was rejected by 38 votes to 15.

The report stage of the Bill was concluded.

HOUSE OF COMMONS

TUESDAY, APRIL 25TH

Slum Clearance in Scotland

Mr. GUY asked the Secretary of State for Scotland the number of houses in Scotland demolished under slum-clearance schemes, or otherwise, during the period from 1919 to the nearest convenient date.—Sir G. COLLINS replied: Complete figures for the period covered by the question are not available, but it is estimated that during the period from 1919 to March 31st, 1933, 24,100 houses were closed or demolished in connexion with schemes promoted by local authorities with State assistance specifically for the re-housing of persons displaced from unfit houses. I have no information as to the number of houses closed or demolished otherwise than in connexion with such schemes.

Medical Service in Ceylon

Mr. RHYS DAVIS asked the Secretary of State for the Colonies whether, in view of the fact that the Government had been in consultation with the British Medical Council with regard to the qualifications of those entering the Government Medical Service in Ceylon, he would bring the matter to the consideration of medical practitioners in Ceylon before any decision was taken.—Mr. MALCOLM MACDONALD (Parliamentary Secretary for the Colonies) replied: I am not aware that the qualifications of persons entering the Government Medical Service in Ceylon have been discussed recently with the General Medical Council. The Ceylon Government has, however, had under consideration the recommendations made by Sir Richard Needham, who reported on behalf of the General Medical Council, on the technical education provided by the Ceylon Medical College, and the Council have been informed of the measures which the Ceylon Government contemplate in furtherance of those recommendations. The extent to which medical practitioners in the Island are to be consulted regarding such measures is a matter for the Island Government to decide.

Medical Diary

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

TUESDAY, May 2nd.—5.30 P.M., ORTHOPÆDICS. (Cases at 4.30 P.M.)

WEDNESDAY.—5 P.M., HISTORY OF MEDICINE. Dr. A. P. Cawadias: The Historical Development of Gastro-enterology and Metabolism. A discussion will follow.

THURSDAY.—8.15 P.M., TROPICAL DISEASES AND PARASITOLOGY. Dr. Hugh Willoughby: The Work of a Port Health Officer in the Thames.

FRIDAY.—10.30 A.M., OTOLOGY. (Cases at 9.30 A.M.) Discussion: The Treatment of Chronic Suppurative Otitis Media. Opener: Mr. Ritchie Rodgers. Demonstration: Dr. Karl Müller (Carlsbad): Apparatus for Testing and Treatment of Deafness. Cases: Dr. Albert Gray: 1 and 2. Bilateral Acusticus Tumour. Other cases will be shown. 5 P.M., LARYNGOLOGY. (Cases at 4 P.M.) Cases and Specimens will be shown. 8.30 P.M., ANÆSTHETICS. Paper: Mr. V. E. Negus: The Bronchoscopic Diagnosis and Treatment of Lung Complications following Operations.

NOTE.—The Annual General Meeting will be held in all Sections, and the officers and council elected for 1933–34.

WEST LONDON MEDICO-CHIRURGICAL SOCIETY.

FRIDAY, May 5th.—7.15 P.M. (at Hotel Rembrandt, Brompton-road, London, S.W.), Dr. G. H. Oriel: The Allergic State.

EUGENICS SOCIETY.

WEDNESDAY, May 3rd.—5 P.M. (Royal Society, Burlington House, London, W.), Dr. Aubrey Lewis: The Inheritance of Mental Disorders.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF PHYSICIANS, Pall Mall East, S.W.

TUESDAY, May 2nd, and following THURSDAY.—5 P.M., Dr. E. Arnold Carmichael: The Peripheral Pathway for Sensation. (Oliver-Sharpey lectures.)

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.

MONDAY, May 1st, to SUNDAY, May 7th.—MAUDSLEY HOSPITAL, Denmark-hill. Course in Psychological Medicine, every afternoon.—LONDON CLINIC AND INSTITUTE OF PHYSICAL MEDICINE, Ranelagh-road. Course in Physical Medicine. Three evenings weekly at 8 P.M.—CITY OF LONDON HOSPITAL FOR DISEASES

OF THE HEART AND LUNGS, Victoria Park, E. Week-end Course in Cardiology, all day Sat. and Sund.—ST. JOHN'S HOSPITAL FOR DISEASES OF THE SKIN, Leicester-square. Course in Dermatology. Clinical instruction every afternoon and evening. Lectures, daily at 5 P.M.—ST. MARY ABBOTS HOSPITAL, Marloes-road. Course in Uterine Infections in Obstetrics and Gynæcology. Mond., at 5 P.M., Tues. and Thurs., 10–12 noon, and Wed. and Frid., 5.30 to 7 P.M.

WEST LONDON HOSPITAL POST-GRADUATE COLLEGE, Hammersmith-road, W.
MONDAY, May 1st.—10 A.M., Medical Wards, Skin Clinic. 11 A.M., Surgical Wards. 2 P.M., Operations, Medical, Surgical, Eye, and Gynæcological Clinics.
TUESDAY.—10 A.M., Medical Wards. 11 A.M., Surgical Demonstration. 2 P.M., Operations, Medical, Surgical, and Throat, Nose, and Ear Clinics.
WEDNESDAY.—10.30 A.M., Medical and Children's Wards, Children's Clinic. 2 P.M., Gynæcological Operations, Medical, Surgical, and Eye Clinics.
THURSDAY.—10 A.M., Neurological Clinic. 11.30 A.M., Fracture Demonstration. 2 P.M., Medical, Surgical, Eye, and Genito-urinary Clinics.
FRIDAY.—10 A.M., Skin Clinic. 12 noon, lecture on Treatment. 2 P.M., Operations, Medical, Surgical, and Throat, Nose, and Ear Clinics.
SATURDAY.—10 A.M., Medical Wards, Children's and Surgical Clinics. Surgical Wards.

ST. MARK'S HOSPITAL, City-road, E.C.
THURSDAY, May 4th.—4.30 P.M., Dr. J. K. Hasler: Spinal Anæsthesia.

ST. PETER'S HOSPITAL FOR STONE, Henrietta-street, W.
WEDNESDAY, May 3rd.—3 P.M., Mr. F. J. F. Barrington: Epithelial Tumours of the Bladder.

ST. PAUL'S HOSPITAL, Endell-street, W.C.
WEDNESDAY, May 3rd.—4.30 P.M., Mr. H. P. Winsbury-White: The Causes of Frequency of Micturition with Special Reference to Diagnosis and Treatment.

CENTRAL LONDON THROAT, NOSE, AND EAR HOSPITAL, Gray's Inn-road, W.C.
MONDAY, May 1st.—Intensive Post-graduate Course daily.

LONDON SCHOOL OF DERMATOLOGY, St. John's Hospital, Leicester-square, W.C.
MONDAY, May 1st.—5 P.M., Dr. S. E. Dore: Differential Diagnosis in Skin Diseases.
TUESDAY.—5 P.M., Dr. H. W. Barber: Alopecia Areata and Vitiligo.
WEDNESDAY.—5 P.M., Dr. H. Corsi: Diseases of the Nails.
THURSDAY.—5 P.M., Dr. A. C. Roxburgh: Differential Diagnosis of Some Common Skin Diseases.
FRIDAY.—5 P.M., Dr. G. B. Dowling: Skin Diseases Due to Protein Sensitisation.

CHADWICK PUBLIC LECTURES.
THURSDAY, May 4th.—5.15 P.M. (at the Royal United Service Institution, Whitehall, S.W.), Surgeon Vice-Admiral R. St. G. S. Bond, Medical Director of the Navy: Preservation of the Health of the Men of the Navy.

MANCHESTER ROYAL INFIRMARY.
TUESDAY, May 2nd.—4.15 P.M., Dr. A. H. Holmes: The Significance of Hæmoptysis.
FRIDAY.—4.15 P.M., Dr. D. E. Core: Demonstration of Medical Cases.

ROYAL HOSPITAL FOR SICK CHILDREN, Glasgow.
WEDNESDAY, May 3rd.—4.15 P.M., Dr. Stanley Graham: Medical Cases.

Appointments

WILLIAMSON, O. K., M.D. Camb., F.R.C.P. Lond., has been appointed Honorary Consulting Physician, Buchanan Hospital, St. Leonards-on-Sea.

Surgeons under the Factory and Workshop Acts: DEVLIN, C. V., M.B., B.Ch. Dub. (Heckington, Lincoln); HICKS, C., M.B., B.Ch. Glasg. (Belbroughton, Worcester); MACRAE, C. D., M.B., Ch.B. Aberd. (Huddersfield East, York).

Vacancies

For further information refer to the advertisement columns

Birmingham and Midland Eye Hospital, Church-street.—Out-patient Officer. One guinea per session. Also H.S. £110.
Birmingham, Dudley-road Hospital.—Cas. O. At rate of £200.
Birmingham University.—Lecturer in Pathology. £400.
Bradford Royal Infirmary.—H.P. £135.
Central London Throat, Nose, and Ear Hospital, Gray's Inn-road, W.C.—Hon. Second and Third Assts. to Out-patients' Dept. Also Third Res. H.S. At rate of £75.
Chester Royal Infirmary.—H.P. £150.
Eastbourne, Princess Alice Memorial Hospital.—H.S. At rate of £150.
Forest Gate Hospital, Forest-lane, Forest Gate, E.—Deputy Med. Supt. £525.
Guildford, Royal Surrey County Hospital.—H.S. £150.
Halifax, St. Luke's Hospital.—Sen. Res. M.O. £350.
Harold Wood Hospital, Essex.—Res. Asst. M.O. £250.
Hospital for Sick Children, Great Ormond-street, W.C.—Res. Med. Supt. £300.
Ilford, King George Hospital.—H.S. At rate of £100.
Kingston-upon-Hull City and County.—Asst. M.O.H. £600.
Leeds Public Dispensary.—Hon. Physician.
Lincoln County Hospital.—H.S. At rate of £150.
London Homœopathic Hospital, Great Ormond-street, W.C.—Asst. Physician.
London Lock Hospital, 283, Harrow-road, W.—Surgical Registrar. At rate of £100.
Macclesfield General Infirmary.—Second H.S. At rate of £150.
Marie Curie Hospital, 2, Fitzjohn's-avenue, N.W.—Radiologist for Deep X Ray Therapy Dept. £500.
Mildmay Mission Hospital, Austin-street, Bethnal Green, E.—Asst. Cas. O. At rate of £125.
Minehead and West Somerset Hospital.—Res. H.S. At rate of £150.
Mount Vernon Hospital, 32, Fitzroy-square, W.—Asst. Radiologist.
National Hospital for Diseases of the Heart, Westmoreland-street, W.—Out-Patients' M.O. At rate of £125.
National Temperance Hospital, Hampstead-road, N.W.—Lady Dietitian. £120.
Oldham Royal Infirmary.—H.S. At rate of £175.
Plymouth, City Hospital.—Asst. Res. M.O. £350.
Plymouth, South Devon and East Cornwall Hospital.—Res. Surg. O. At rate of £150.
Princess Louise Kensington Hospital for Children, St. Quintin-avenue, W.—H.S. £75.
Putney Hospital.—Radiologist.
Queen Mary's Hospital for the East End, E.—Dent. Anæsth. £25.
Rochdale Infirmary and Dispensary.—Jun. H.S. £200.
Royal Chest Hospital, City-road, E.C.—H.P. At rate of £100.
Royal Free Hospital, Gray's Inn-road, W.C.—Asst. M.O. for V.D. Dept. £350. Also Sen. Res. M.O.
St. John's Hospital, Lewisham, S.E.—Hon. Gynæcological Surgeon.
St. Thomas's Hospital Medical School, University of London.—Demonstrator in Physiology. £400.
Scotland, Department of Health.—Regional M.O. £800.
Sheffield Royal Infirmary.—Asst. Pathologist to Infirmary, &c. £500.
Shrewsbury, Royal Salop Infirmary.—Cas. O. and Res. Anæsthetist. At rate of £160.
Stafford, Staffordshire General Infirmary.—H.S. At rate of £200.
Stockport Infirmary.—H.P. £150.
Stoke-on-Trent, City of.—M.O. of V.D. Centre. £750.
Swansea Hospital.—Sen. Res. Officer. £300.
Tunbridge Wells and Counties General Hospital.—H.S. £160.
Ventnor, I. of W., Royal National Hospital for Consumption, &c.—Jun. Asst. Res. M.O. At rate of £300.
Warwick, King Edward VII. Memorial Sanatorium, Hertford Hill.—Asst. M.O. At rate of £200.
Watford, County Institution, "Shrodells."—H.S. At rate of £150.
Western Ophthalmic Hospital, Marylebone-road, N.W.—Jun. H.S. At rate of £100.
Westminster Hospital, Broad Sanctuary, S.W.—Asst. Pathologist. £350.
Wolverhampton Royal Hospital.—H.S. for Ear, Throat, and Nose Dept. At rate of £100.
Worcester Royal Infirmary.—Third H.S. £120.
York, North Riding Mental Hospital.—Res. Asst. M.O. £350.

The Chief Inspector of Factories announces vacancies for Certifying Factory Surgeons at Colne (Lancaster), Blackwood (Monmouth), and at Grangemouth (Stirling).

Births, Marriages, and Deaths

BIRTHS

ARTHUR.—On April 10th, at "The Oaks," Fakenham, the wife of G. Kilpatrick Arthur, M.R.C.S., L.R.C.P., of a daughter.

NICHOLLS.—On April 15th, the wife of Hubert A. Nicholls, M.R.C.S., L.R.C.P., Caradon, Rayleigh, Essex, of a daughter.

PAGAN.—On April 11th, at St. James-road, Southampton, the wife of Dr. A. T. Pagan, of a son.

RAMAGE.—On April 16th, the wife of John S. Ramage, F.R.C.S.E., of Tunstall, Stoke-on-Trent, of a son.

MARRIAGES

BARON—JACOB.—On April 20th, at the Bayswater Synagogue, Dr. Cyril F. J. Baron, to Kathleen, daughter of Mr. and Mrs. Henry M. Jacob, of "Denewood," Daleham-gardens, Hampstead.

GAIRDNER—CRIMP.—On April 19th, at St. Peter's Church, London Docks, Alan Gairdner, F.R.C.S., to Elizabeth Crimp, only daughter of Mr. and Mrs. Derek Crimp.

LEAVER—ROBINSON.—On April 22nd, at St. Peter's Church, Ealing, Robert Henry Leaver, M.R.C.S., L.R.C.P., to Audrey, younger daughter of Major R. A. Robinson, T.D., and Mrs. Robinson, of Corfton-road, Ealing, W.

DEATHS

BRANNIGAN.—On April 21st, at Fircroft, Englefield Green, John Henderson Brannigan, late Major R.A.M.C. (retd.), aged 78.

CHEETHAM.—On April 18th, at Greencroft, Guiseley, Yorkshire, Walter Henry Cheetham, M.D., D.P.H., Surgeon-Major, Yorkshire Hussars (retd.), aged 76.

HOGAN.—On April 20th, suddenly, Dr. C. Evelyn Hogan, Baron's Court.

HOWIE.—On April 22nd, at Craig-na-Hullie, Strathdon, Phadlallah Elias Howie, M.B., C.M. Edin., medical officer to Strathdon and Glenbuchat, Aberdeenshire, aged 69.

O'DWYER.—On April 21st, at Clive-court, Maida Vale, Lieut.-Col. Malachi O'Dwyer, I.M.S. (retd.), aged 76.

SHANNON.—On April 20th, at Woodside-place, Glasgow, David Shannon, D.L., M.B.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

NOTES, COMMENTS, AND ABSTRACTS

SOME PROBLEMS OF ADOLESCENCE*

BY SYBILLE YATES, M.R.C.S.

THOSE of us who have to deal with people who have difficulty in adjusting to life are given the privilege of looking with the adolescent behind the screen of outer behaviour with which he usually protects himself. The intimate thoughts and strong feelings that are thus revealed may be puzzling, disturbing, and even shocking, and you may be disposed to doubt their existence, because you have never met with anything of the kind. But the general non-recognition of these feelings is no proof of their non-existence; and it is not surprising when one considers that the adolescent hides them not only from the outside world but also, to a great extent, from himself.

It may be argued that these feelings and difficulties exist only in people who find it hard to adjust themselves and have therefore come for treatment. This is not so; for they are found also in the analysis of people in whom there are few conscious difficulties, who come for purposes of training and self-knowledge so as to be better able to carry out their work with children. They have had to face the same problems, but circumstances have made it possible for them to deal with their conflicts successfully.

I have taken adolescence as the years between 14 and 21. This limit is necessarily arbitrary, and can be extended both ways, as adolescence does not suddenly begin or end. There is, nevertheless, a sharp demarcation, for an adolescent is neither a child nor an adult, and in this is the core of the problem. The world of the adolescent is different from that of the child or of the grown-up, and the boundaries of the child world and the adolescent world are more distinct. The adolescent is a mongrel. He has the privileges neither of a child nor of an adult, and the limitations neither of a child nor of an adult. He develops adult physical powers and yet has little or no sphere of adult action. As a patient once put it, he is told "to *be* a man but on no account to act as one." That is to say, he is told to behave as a man, but with a great number of restrictions. He has the obligations of manhood without its privileges.

Day-dreams and Ambitions

During adolescence the phantasy and dream life become much richer; this is the time of day-dreams, ambitions, and ideals, of sudden conversions, of great enthusiasms. It is the time for altering the world as rebels and reformers, but in *thought*, not in action to any great extent. There is a development and extension of interests and much avid learning, an eager curiosity about all things. It is, above all, the time of ideas: debates, discussions, and introspection. All these things are normal to the age of adolescence.

What do we ask our adolescents to do? We asked them to study first at a boarding-school and then at a college in a world set apart for them, having little or no contact with the world of the family or labour of any kind or politics. Their only contact is that they are to study so that in the future they may act as citizens in the real world. So they do study and think about the world and its problems, yet it is not a real world they think about; it is itself a world of their thoughts. Very often they plan impossible plans. They have all the qualities of omnipotence divorced from the thwarting facts of reality. They wish to alter all that exists in industry, politics, and home life; and they do so—in thought.

Sometimes the environment is made even more artificial by the sudden transposition of the boy or girl, by means of a scholarship, from a struggling working-class family to the rarefied heights of Oxford or Cambridge, where they associate with others who have not been accustomed to think of the limitation of spending powers. We expect them then to come back after four years of this atmosphere, and settle down to teaching in a secondary school, and we are surprised when they find it all a dreary grind, and nothing like their dreams. There is also the other extreme where the girl or boy who comes straight out of school, having been fed on artificial dreams of a noble future, must plunge into an office and become a clerk. There is no more dreaming then, nothing ahead but a contemplation of days and years filled from 9 till 6 with dull routine, with no chance of advance or progress. Where is the nobility of his part in the world now?

In the home itself the situation is far from easy. Some parents do not want their children to grow up, but there are many more who, though apparently desiring their children to grow up, do in fact at the same time prevent their mental and social growth by demanding from them the same obedience and dependence as during childhood. In this way they quite unintentionally bind the boy or girl to themselves, by making themselves indispensable to them and by not allowing the growing adolescent the opportunity to exercise his own control and judgment. Sometimes, in fact, any attempt to do so involves serious conflict. Such phrases as "Why didn't you ask me first?" or "It would have been better if you had waited for me before you did that!" are very familiar, and these are only slight reproaches. Exaggeration of the pains and sorrows of adult life and the responsibilities of marriage and children tend to make growing-up a terrifying prospect. The strains of growth are difficult enough in themselves, and the adolescent tends to be somewhat apprehensive over his new powers and his ability to cope with them. In many cases he is only too glad to fall back to the childhood state of dependence and evade his responsibilities.

On the other hand, the urgent demand for adventure to test these new powers leads him, when faced with a restricting and reproving parental attitude, to rebellious outbursts in an assertion of his complete independence. These may at times have as disastrous results for the individual and for society as has the refusal to grow up. Conflict with parents is often shown by running away from home and starting life alone. I think we need to remember, however, that in so doing the young man or woman is not only fighting his parents, who wish to keep him a child, but also trying to overcome his own, often unconscious, tendencies to remain utterly a child, dependent on his parents.

On the other hand, suddenly to push off an adolescent on his own resources makes life equally difficult for him. A balance must be maintained in which parents and teachers are there to give the advice and support which is so much needed at these times.

Frustrations

Many find the strain of adolescence too much; they cannot get past this age without coming a crash. In some way or another many do crash; some have dementia præcox or schizophrenia and stay on in a land of unreality for all time; others crystallize into homosexuals who can never approach the opposite sex in anything but friendly relations, and can think of love only with their own sex. Some again become robots as a protection, others fail at examinations and in their first occupations. Others experience all forms of sexual life outside marriage before they are 20. Nearly every adolescent unfortunately faces some kind of disillusionment which may cripple his life powers and take much

* Taken from a lecture given to the Medical Women's Federation, Psychological Groups.

of his zest and radiant enthusiasm from him. How many young men or women in the early 'twenties have been heard to complain: "There is no point in life, it is not worth living really. What is it all for?"

The reason for this absence of vision is that the scales fall too suddenly, and sight is dimmed for the rest of life. Cannot we see something of the answer when we see that there is no real place in society given to the adolescent? To have powers and not to use them necessitates living in a world of phantasy and dreams. But these dreams are valuable, and is not this state inherent in youth all the world over?

Among primitive peoples there is no long period in which adolescents are isolated from the working everyday world. There is often a period of initiation in which they are taken into the tribe and taught the functions of a member of the tribe from the point of view of sexual relations, work regulations, and ceremonial regulations. The period of isolation and abstinence is short. The adolescents are then permitted to act, to function as men and women; in fact, from the time of quite early childhood, they play some part in the workings of the life of their tribe—a part suitable to them, but a definite and not an artificial part. Life is simpler there, and it is therefore proportionately more simple to give them a real function in the life of the tribe.

You will say, "But what a relatively low level of cultural development! Art, literature, and science are little known." In this I think that you will be right—the period of frustration as we have it may be necessary for cultural growth, and may supply the motive force and driving energy for the development of cultural activities. The question remains: "Need the frustration be so great that it leads to crippling and loss of power?" If we understand the full strength of frustration involved, I think we should see to it that some other way be found. For the adolescent differs from the adult, not in the absence of sexual desire, but only in the fact that he is not allowed to gratify it.

The Unconscious Emotional Life

The central difficulty here is one of greatly increased frustration, and therefore proportionately greater attempt at control. Control is good; but if the brakes are applied too hard, then the engine is damaged.

The whole of childhood is to a certain extent a period of frustration. The first five years of life are a period in which desires are felt intensely; next comes a latency period when things are relatively quiet; and then, at puberty, sexual development places great demands on the mental energy. There is a difference between the problems of the child of 4 with bodily excitement, and those of the boy of 18, for with the former there is no possibility of fulfilment.

The young child's difficulty—learning to control its excretion—arises not only because control is a hard thing to learn from a physiological point of view, but also because of the emotional conflict round the whole question of the excretory products. Indeed, the young child, faced with helplessness and powerlessness in comparison with adults and hemmed in by countless frustrations, feels in his own excretory products a magical power with which he can fight the adult. The phantasies are based on a certain amount of reality-experience—that is to say, during early childhood the emotions of the parents are, to a certain extent, affected by the child's excretory habits. Take, for example, the upset caused to the whole family by persistent enuresis. When a child cannot bring the adult to its bedside for fun it can do so by saying that it wishes to pass water. In children's play these phantasies are very obvious, and also in the phantasies of insane patients; in the belief of primitive peoples there are similar ideas about the magical power of excretion.

Then puberty comes along and the boy or girl is faced with products from the body which they cannot control, do what they will—for emissions or wet dreams, menstruation, and often a mucous flow of "whites" cannot be controlled. At puberty the unconscious angers are also greater. The unconscious wishes that function in early childhood are revived, and the products act again as magical weapons. The boy's emissions and the girl's menstrual flow often become to the unconscious mind every bit as filthy and as needing control as the excretory products did in childhood, and the conflicts and guilt feeling around them are immense.

The difficulty does not end here for, just as in childhood, when beds were wetted often as a result of some form of physical and emotional excitement, aroused possibly by games or caresses from the father or mother, so later the emissions and whites become associated with sexual sensations and these are felt to be prohibited. When the child in these modern days is told all about childbirth and sex relations, the subject of pleasure and sensation is left out; the child has feelings of sensory pleasure at times, and knowing so much and not this, thinks that he must be the only one to have these awful feelings—or, at any rate, if adults have them, they must be so dreadful a secret that they have not dared to tell him. The so-called sexual enlightenment of children does more harm than good when it is done by halves.

Guilt and Fears

A further problem arises when the adolescent turns, as so many do, to himself for sensory satisfaction. This is so often condemned by his elders that it is regarded by himself as something degrading, and he has intense feelings of guilt in connexion with it. In addition to this, the phantasies which accompany or supersede masturbation so often have an element of ambition, envy, and power, gained at the expense of parents, because they appear in the light of those who enjoy pleasures from which they exclude their children. When the moral censorship exercised in the mind forbids this form of satisfaction, the sense of guilt engendered by pursuing it becomes too great and causes the individual to give it up; neurotic illness may result either in the continuation of masturbation under the stress of conflict, or when the strain involved in the attempt to control it is too great.

Guilt around masturbation is very often the cause of morbid fears about changes in the sexual organs. For example, in the course of the growth and descent of the labia the girl too often fears that there is something abnormal, that it is her doing, that she has interfered with herself, and perhaps made one labium longer than the other. The fears may be even vaguer, that somehow, through her own fault, "something" has gone wrong. With the boy, anxieties often arise about the diminution in size of the penis after emission, coupled with the feeling of exhaustion after masturbation in which there has been conflict. He may fear reaching some completely exhausted state in which there is no more semen, or that his penis has become smaller, or larger, than the average. These and many other anxieties abound at this time.

Again, the whole problem of exhibitionism is revived at this age. The attempts to attract and draw attention to the self, by means of clothes, jewellery, and so forth, which occupy the thoughts of the adolescent, are closely linked in the unconscious mind with the efforts of the small child to draw attention to himself by means of his naked body. These early efforts were often reprimanded, and now, in their sublimated form, they become forbidden by the mind, and we get the increase of puritanism as a reaction. Or there is an attempt to defy the censor by the exaggerated and blatant application of rouge and paint.

Of all the unconscious fears perhaps the most intense are those associated with the functioning as an adult, male or female, in intercourse. Putting it generally, it is the fear of being hurt or hurting the sexual partner.

There are innumerable reasons for these unconscious fears, but I want to stress their function in the life of the adolescent. It is a protective one. The fears form part of the individual's control system—his system of brakes. One only has to forbid a thing strongly enough, and it will become fearful—witness the manifold taboos of all primitive peoples and the fear which is associated with them. A thing thus feared automatically loses its attraction, and the domination of these fears is proportionate to the necessity for control. There is often a more preconscious fear about marriage in general, the impossibility of finding anything but unhappiness and drudgery in it. This fear is reinforced if the parents do not agree and the child's experience of home life has not been a happy one. In these circumstances adult life looms ahead as a menace.

The final set of problems belongs to those of work and a career. Every interest and sublimation has its roots in early childhood wishes. Some of these are loving wishes and others are hating ones, and both sets of wishes are used in every sublimation. Difficulties in work arise where the angry, competitive wishes are too strong and cannot be tolerated by the love side of the individual. Where the wishes for power have been on such an immense and fantastic scale, the acquiring of the small degree of real power which every work and career brings with it is felt to be a realisation of the aggressive unconscious wishes for power and is rejected as such by the conscious side of the personality.

Social Responsibility

I am afraid I can suggest no satisfactory solution to the problem. All mankind has to endure frustration from the cradle upwards, and all have unconscious minds and phantasies of power and aggression in consequence. And I do not think that much conscious reasoning or instruction will go far to still the fears and conflicts of adolescents. If the adolescent is told that intercourse and childbirth are not the terrifying things that he imagines, it is only the conscious mind that is assured; the unconscious phantasies persist and life is made no easier.

I will not, however, be entirely pessimistic, for if we understand the problems of adolescents our attitudes will tend to change, and in our attitude lies the real solution, for our attitude forms part of the environment of the adolescent. Phantasies are the dominating things, but reality environment cannot be ignored, for it has a great influence in modifying the fears of phantasy. Adults can, by their attitudes, prove or disprove phantasies to a certain extent. Everyone of us unconsciously is continually testing out phantasy by reality.

A patient of mine who believed implicitly in the terrible power of sputum saw on the trams the notice: "Do not spit. Penalty, 40*s*." "Oh," she said, "then it is true. For anyone to spit is a very awful and dangerous thing." Now, if in our attitude we could take down the "40*s*." tram signs we should diminish the importance of phantasy instead of reinforcing it. It may be only a little thing, but it might make all the difference in that delicate balance between health and disease. And how can we do it? Cannot we diminish the frustrations endured, and by this diminution give an understanding permission to a certain amount of adult functioning?

In the realm of work, for example, must we appear to say to adolescents, just as the parents of their phantasy say: "You must think and learn only for the future; you may not join in now"? Could we not by our real attitude help them to discount inhibiting phantasy? Let them coöperate with us—the phantasy is of competing with us. To exclude them from work and social responsibility results often in omnipotent dreaming. Youth is often blamed for selfishness, but do we not tend to force selfishness on it by closing the door to coöperation? For adolescence is really one of the most altruistic of ages; there is a great need for service, and a devotion to people and causes, and a driving necessity to come in contact with higher things. Could we not utilise this energy at the time when it is greatest? Could we not make youth feel itself necessary instead of having to battle for occupation and a function in society only after years of preparation during which the adolescent begins to doubt whether he will ever be able to function in this final activity? If only he could function all the way along the line it would act as a tremendous reassurance to him.

Could we not gradually rearrange our social system so that it should include something on the lines of the apprenticeship of the Middle Ages? For instance, the first-year student in medicine might do some bandaging in the out-patient department in a perfectly capable way. If boy scouts and girl guides can do this, surely medical students could too. There should be some real functioning, right from the beginning of their studies, some sphere where they are not in the way, but of real use. In the same way engineering should be more connected with the workshop all the way along, and in schools there should be more contact between learning and real life. Speak to a schoolboy of the experiments in the laboratory, and you will find that those which impress him are the ones in which real things are made—soap from fats, for instance.

Where the specialist training cannot include actual performance, it might be possible for every student to ply some trade during part of the time of his studies; in some countries students are recruited for harvesting. That this reality assurance does not stand for nought is proved by the fact that some of the best work is done where there is real encouragement given from one or both parents. This encouragement seems to act as a permission, and thus reduces the anxieties which are bound up with ambition. Of course, too great an urging on the part of the parents would act as a hindrance, in that it would drive the youth too hard, making him feel it a compelling necessity to reach heights, in order to satisfy his parents. A condition in the family which militates against any reality assurance is when each parent wishes the child to pursue a different career. Loyalties are divided and the adoption of this career or that appears to be siding with one parent against the other. Obviously this hinders the child's activities.

Attitude of Adults towards Sex

If we turn now to the possibilities of aiding the adolescent in the problems of his sexual life, I think it is in our attitude that we can help most. We can admit frankly to ourselves, and to the adolescent, the normality of his having sensory feelings and of his having love interests, just as we admit this necessity in adult life. But it is not only in the realm of physical, sexual expression that our attitude should change, but also in the understanding of the love of the adolescent—the hero-worship and the grand passion. We tend to mock, and mockery blights these loves. "Why is it," they think, "that every way we love seems to be wrong?" The film shown recently in London, "Mädchen in Uniform," sets out this problem very well. Girls in a boarding school are given no avenue for the expression of their great need to love. One of them falls in love with a woman teacher, and when it is found out, the authorities are aghast and wish to expel her. She is absolutely puzzled: "But what have I done?" she says, "what can I have done to merit such a punishment?"

I once went to a lecture given to young students by a very eminent woman who knew for certain that in her audience would be quite a number of her very great admirers. She was speaking on friendship and told these adolescents among other things how these grand passions of theirs bored her. If only they could know to what extent they bored her and similar adults, she said.

Hero-worship and the identification by loving, as in the grand passion, is the adolescent form of love, and surely to be respected as such. It is the

same with homosexual attractions. The school comes down on a boy walking arm in arm with another boy. Cricket, football, and hockey are emphasised in an attempt to keep out sentiment, and so we get the adult man and woman having sentiments which belong to the age of 16, which should have been expressed and left behind but were not given the chance of expression.

In any severe case of conflict in the adolescent, adult attitude will not count for much, and it is only resolution of these conflicts by psychotherapy which will allow of further growth into adult life. But in others, adults could help to prevent breakdown and dissolution and the loss of that vitality which is so needed in later life, if they did not isolate him and cause him to fight for his maturity and independent personality. Instead, let them give him understanding, and from their wider experience of life advise and support him on his way, when he turns to them for help.

MITIGATED CAPTIVITY

THE foresight and energy with which the Secretary of the Zoological Society of London has carried through the development of a new idea at Whipsnade have been appropriately recognised by naming the beautiful approach from the west Sir Peter's Way. The possibilities of Whipsnade are still largely untapped; but even on the financial side it is helping to solve the difficulties of the society in a time of depression, for whereas the total income at Regent's Park dropped £13,000 last year, the takings at Whipsnade were nearly £6000 up. There was a time when the public complained that they could not find the animals at the country branch. In the main, this complaint was justified by the fact that at Whipsnade the animals are too busy living their own lives to pay as much attention to their visitors as they do at Regent's Park, where the primates on the other side of the grill must afford welcome relief from a life of comparative monotony; but with the development of accommodation at Whipsnade it is proving possible to place many more species on exhibit there. Last year there were added to the collection tigers, polar bears, porcupines, anoas, dingos, Tibetan mastiffs, Chillingham wild cattle, beavers, Soay and Spanish sheep, alligators, and Japanese long-tailed fowl. The losses have been few—two camels, a polar bear, and two nylghaie died of disease, and five large hooved animals died of injuries received in fighting—but the birth-rate at Whipsnade is going up in larger proportion. In two years the Chinese water-deer have more than trebled their numbers, many triplets being born during 1931. The wolves have doubled their original number. Even the emus have begun to lay eggs, and the sarus cranes reared one chick. But it will be many years yet before the park reaches its full development, if the time ever should be reached. The white lion on the edge of the Downs, intended to advertise Whipsnade to those approaching from the north, will still take long to complete, as a great mound of chalk has had to be made to get the head of the enormous beast into the plane of its body. Urgent additions, such as the provision of a monkey hill, a paddock for gnus, and a breeding paddock for bison, have had to be postponed owing to lack of means. Fortunately the new lions' den and tiger pit had been completed in time, and the four docile lions, relics of Bostock's menagerie, have thriven greatly and been a joy to spectators. This den is not suitable for breeding purposes, but the tiger pit has six covered dens which can be heated and are in every way suited for breeding. When funds are available, the society will make a summer enclosure for tigers and a winter enclosure for lions. It is not only at Whipsnade that the Zoological Society has made it possible for native animals to breed unmolested. It has taken over the park at Chillingham Castle, in Northumberland, with the object of preserving the famous herd of white park cattle which, if not direct descendants of the primitive aurochs of Britain, have in any case existed there for several centuries. Lord Tankerville himself supervises the herd, and donors are admitted to Chillingham to see what they can of it, although it is not safe for strangers to approach the cattle, which maintain their own primitive customs, the strongest bull acting as king of the herd until he has been fought and displaced by a younger rival, while the cows retire to the woods to calve and leave their young hidden for nearly a fortnight, returning regularly to suckle them.

While we have laid emphasis on the greatly increased opportunities of natural life for the animals under the society's custody, work still goes on into the nature of disease in the animals under more captive conditions. Lt.-Colonel A. E. Hamerton investigated during the year a total of 904 deaths, comprising 241 mammals, 481 birds, 182 reptiles and amphibians. Of these nearly one-third occurred during their period of acclimatisation—i.e., within six months of their arrival in the gardens. No epizootic disease spread in the collection during the year. The incidence of respiratory disease, accounting generally for 17 per cent. of the deaths, was lower owing to the exceptionally mild, sunny weather of the early winter. Losses from injuries and accidents are associated with a reduction in the rat population of the gardens due to effective poisoning. Tuberculosis is now only responsible for 2·48 per cent. of the mammalian deaths, the progressive reduction in mortality from this cause being attributable to better conditions in housing and feeding; but five cases of tuberculosis occurred among reptiles and amphibians. All the mammals bred and reared in the gardens were free from rickets, but four birds and two reptiles reared by hand died from osteomalacia. Of the seven deaths from tumours, only two were due to cancerous growth: the tigon died from sarcoma of the liver, and a macaw from carcinoma of the kidney. Finally, a word should be given to Miss Ida Mann's care for the eyes of the animals. A python whose eye was excised for panophthalmitis was provided with an artificial eye which greatly improved its appearance. Three apes—a capuchin and two Humboldt's woolly monkeys—were successfully treated for cataract. Monkeys seem to derive more benefit from cataract extraction than do smaller mammals. An ostrich which developed a corneal ulcer, owing to the movement of its nictitating membrane being impeded by a hæmangioma, recovered completely after the tumour had been removed under local anæsthesia.

INCUNABULA IN A PHILADELPHIA LIBRARY

THE library of the College of Physicians of Philadelphia already possesses 406 books of medical interest printed before the year A.D. 1500. The annual report of the library committee for the year 1932 records the addition of four others to this valuable stock.

Albertus Magnus. Paradisus animæ sive de virtutibus libellus. Argentorati, Martinus Flach, 1493. [Hain No. 481.] Gesamtkatalog No. 706.

Beroaldus, Philippus. A.D. 1453–1505. Heptalogus s. Libellus, quo septem sapientum sententiae discuntiuntur. Bononiæ, Benedictus Hectoris, Bononiensis, 1498. [Hain No. 2974.] Gesamtkatalog No. 4138.

Gerson, John. A.D. 1363–1429. De modo vivendi omnium fidelium. Daventriæ, circa 1490. [Hain No. 7671.] Gothic letter, large capitals painted in blue and red.

Plato. Opera. Prohemium Marsilij Ficini Florentini in libros Platonis ad Laurentium Medicum virum magnanimum. Venetiis, Bernardinus de Choris Cremonesis et Simon de Luere, 1491. [Hain No. 13963.]

These rare books, it is stated, have been acquired without in any way interfering with the purchase of current medical publications.